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1620 USERS GROUP PROGRAM REVIEW AND EVALUATION

	Pro	gram No	Date	······································	
	Pro	gram Name:			
ā	1.	Does the abstract adequately describe what it does? Comment	Yes_	_No	
	2.	Does the program do what the abstra	Yes_	_No	
	3.	Is the Description clear, understand Comment_		Yes_	_No
	4.	Are the Operating Instructions under detail? Comment Are the Sense Switch options adequa		Yes_ Yes	
		Are the mnemonic labels identified ounderstandable? Comment	or sufficiently	Yes_	No
	5.	Does the source program compile sa Comment	Yes_	_No	
	6.	Does the object program run satisfa Comment_		Yes_	No
	7.	Number of test cases run Are any restrictions as to data, size adequately in description? Comment	e, range, etc. covered	Yes_	No
	8.	Does the Program meet the minimal Group? Comment		Yes_	_No
	9.	Please list any suggestions to improprogram. These will be passed on to Comment			
	Ple	ase return to:	Your Name		
)		Mr. Robert J. Robinson (PREP) Marquette University Computing Center 1515 W. Wisconsin Avenue Milwaukee 3, Wisconsin	Company Address User Group		
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THIS REVIEW FORM IS PART OF THE 1620 USER GROUP ORGANIZATION'S PROGRAM REVIEW AND EVALUATION PROCEDURE. NONMEMBERS ARE CORDIALLY INVITED TO PARTICIPATE IN THIS EVALUATION.

LP20 LINEAR PROGRAMMING SYSTEM

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LP20 LINEAR PROGRAMMING SYSTEM

Table of Contents

				Page
		Dec	k Key	iv
		Has	h Total	v
		Abs	tract	vi
	I.	Det	ailed Description of System	
		A.	Introduction	1
		В.	Description of separate programs	8
		C.	Detailed flow charts	12
	II.	Inp	out-Output Format	
		A.	Input format for data	36
1		В∙	Output format	41
		C.	Object deck format	41
	III.	Sam	mple Problems	43
	IV.	Ope	erating Instructions	
		A.	Main sequence	53
		в.	Solution test	56
		C.	Parametric programming	57
		D.	Variations	58
	٧.	Dec	ck Listings	
		A.	SPSII listings	
			1. Data loader, LP20-1	60
			2. Shadow price, LP20-2	69
			3. Dual, LP20-3	75
J			l. Simplex, LP20-l	85
			5. Solution print, LP20-5A	96

C

				Page
		6.	Solution punch, LP20-5B	104
		7.	Matrix print or punch, LP20-6	113
		8.	Matrix punch for restart, LP20-7	123
		9•	Solution test, LP20-8	125
		10.	Parametric solution, LP20-9	128
		11.	Parametric dual, LP20-10	136
	В∙	Obje	ect deck listings	
		1.	Data loader, LP20-l	功8
		2.	Shadow price, LP20-2	151
		3.	Dual-simplex, LP20-3-4	154
		4.	Solution print, LP20-5A	159
		5.	Solution punch, LP20-5B	162
		6.	Matrix print or punch, LP20-6	165
		7.	. Matrix punch for restart, LP20-7	169
		8.	. Solution test, LP20-8	170
		9.	. Parametric solution, LP20-9	172
		10.	. Parametric dual, LP20-10	176
	D.	Sar	mple problem imput decks	180
VI.	. Co	re La	ayout	183

Deck Key

Deck number		Description	Sequence numbers

1	LP20-1	SPSII source deck	00010-02380
2	LP20-2	SPSII source deck	02390-03530
3	LP20-3	SPSII source deck	03540-05570
4	LP20-4	SPSII source deck	05580-07780
5	LP20-5A	SPSII source deck	0 7790- 09600
6	LP20 - 5B		09610-11790
2 3 4 5 6 7 8	LP20-6	SPSII source deck	11800-14160
8	LP20-7	SPSII source deck	14170-14570
9	LP20-8	SPSII source deck	14580-15140
10	LP20-9	SPSII source deck	15150-16960
11	LP20-10	SPSII source deck	16970-19010
12	LP20-1	SPSII condensed object deck	0- 83
13	LP20-2	SPSII condensed object deck	0- 92
1 4	LP20-3	SPSII condensed object deck	0- 142
15	LP20-4	SPSII condensed object deck	0- 150
16	LP20-5A	SPSII condensed object deck	0- 82
17	LP20-5B	SPSII condensed object deck	0- 92
18	LP20-6	SPSII condensed object deck	0- 93
19	LP20-7	SPSII condensed object deck	0- 13
20	LP20-8	SPSII condensed object deck	0- 69
21.	LP20-9	SPSII condensed object deck	0- 124 13D
22	LP20-10	SPSII condensed object deck	0- 142
23	LP20-1	Condensed object deck	
5 Ji	LP20-2	Condensed object deck	
25	LP20-3-4	Condensed object deck	
26	LP20-5A	Condensed object deck	
27	LP20-5B	Condensed object deck	
28	LP20-6	Condensed object deck	
29	LP20-7	Condensed object deck	
30	LP20-8	Condensed object deck	
31.	LP20-9	Condensed object deck	
32	LP20-10	Condensed object deck	
33	Data deck		
34		, test solution, simplex	
35	Data deck	, dual	

All 35 decks are preceded by a hash total card (punched by Hash Total 1.6.031). The hash totals are given on the next page. The hash total cards should be removed from decks 1-11 and 33-35 before using. The hash total cards for decks 12-32 may either be removed or not. They do not interfere with loading object decks.

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		HASH	TOTAL	DECK	NO.
	EQUAL EQUAL EQUAL EQUAL	5003522817 5329903337	31853283048 7910246234 <u>7</u> 7641416327 <u>2</u> 36827641790	1 2 3 4	
	EQUAL EQUAL EQUAL EQUAL	27 3495 0149 45 17 3 34 366	06850548253 94407771476 61241833560 19146882780	5 6 7 8	
	EQUAL EQUAL EQUAL	7795133660 0318016958	0507934203 <u>8</u> 3188363736 <u>2</u> 7503474066 <u>3</u>	9 10 11	
	EQUAL EQUAL	7927359624	9487523934 <u>8</u> 4883018191 <u>2</u>	12 13	
	EQUAL EQUAL EQUAL EQUAL	9671802117 441288241 4305585211	3686466215 <u>4</u> 7055822996 <u>3</u> 37922456390 1761018242 <u>3</u>	14 15 16 17	
٠	EQUAL EQUAL EQUAL EQUAL	4567430509 071544441	7114599800 <u>0</u> 9749697076 <u>3</u> 10657704506 24747521076	18 19 20 21	
	EQUAL		39083657005	22	
	EQUAL EQUAL EQUAL	9493037775 7920808418	+2 338065860 565 33800108 81456621240	23 24 25	
	EQUAL EQUAL EQUAL EQUAL	8790877509 8632194090 8576929150	6583440036 <u>1</u> 5748026699 <u>7</u> 6492686716 <u>1</u> 0932198715 <u>1</u>	26 27 28 29	
	EQUAL EQUAL	4054322464 5766999393 8392482388	4187596285 <u>7</u> 3017582664 <u>5</u> 84165643830	30 31 32	
	EQUAL EQUAL EQUAL	8205071679	2690481050 4 9010089250 4 0375979503 7	33 34 35	
	-				

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1620 Users Group Library, Program Abstract

Title

LP20 Linear Programming System.

Subject Classification

10.1.

Author and Organization

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Purpose and Description

This system solves the general linear programming problem. Either or both the dual or simplex algorithm is used. Provision is made for testing the solution by substitution in the restraining equations, for printing or punching the entire matrix with explicit decimal format, and routines are provided for semi-automatic parametric change of the constraints.

Method

The method used is the revised simplex and/or dual algorithm. See Saul I. Gass, <u>Linear Programming Methods and Applications</u> (New York: McGraw-Hill Book Co., Inc. 1958).

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Restrictions and Range

Where M is the number of restraining equations and N is the number of real activities, the limitation on problem size is given by

$$(M + 2)(N + 3) \le \frac{\text{Memory Capacity} - 4800}{10}$$

Except for this limitation, the system is independent of memory size.

Storage Requirements

Program goes to 4775; data starts at 4800 and goes to upper memory.

Equipment Specifications

Card system, any size memory, automatic divide, and no other special features.

Additional Remarks

Eight and 2 floating point arithmetic; SPSII with floating point subroutines, nonrelocatable; SPSII listings and flow charts; listing of actual condensed decks; source decks; SPSII condensed decks; operating decks condensed by routine similar to squeeze; and sequence of 10 semiindependent routines.

Note to Users

After the manual was prepared, it was found that the parametric programming routines may cycle if the current solution is degenerate, i.e. having more than one zero element in the b vector. If it is desired to start the parametric solution with one element of b started at zero and then made larger, other zero elements of b should be perturbed slightly by changing the element to a very small number, for example to 0.00001. Alternately, one may start with the selected element of b so large that the parametric disposal vector is in the optimum solution and then subtract. In this case normal truncation error will usually provide sufficient perturbation so no cycling will occur.

One additional change has been made in LP20-9. If the parametric vector is in the current basis and a multiple of the parametric vector is to be added to b, the program prints ID BASIC and stops. If a multiple of the parametric vector is to be subtracted, the level of the parametric vector in the current solution is reduced to zero and the parametric process continues.

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LP20 LINEAR PROGRAMMING SYSTEM

I. Detailed Description of System

A. Introduction

The LP20 Linear Programming System borrows heavily from C. R. Nichols 1620 Linear Programming Code for paper tape input-output and the adaptation of this program by Art Nickel and Lou Davis for card machines. The primary differences are that the current version is written in SPSII with a complete SPSII listing; provision is made for printing or punching in explicit decimal form the entire matrix; provision is made for testing the solution by substitution in the restraining equations; and routines are provided for parametric change of the constraints.

The LP20 Linear Programming System, as compiled, requires a Card 1620 with automatic divide. It is designed so that the sequential programs occupy locations from 00402 to 04764. Data and working areas begin at 04796 and run to upper memory. Since the simplex program occupies the largest space, this program should be recompiled for machines without automatic divide, and the reference address, W (now set at 4809) should be set at least 14 digits beyond the last digit used by the compiled program and subroutines.

As currently compiled, the limitation on problem size is given by: $(M + 2)(N + 3) \leq \frac{\text{Memory} - 4800}{10} ;$

where M = number of restraining equations and N = number of nonbasic variables.

Except for this restriction, the program is independent of memory capacity.

If additional floating point accuracy is desired, the system can be recompiled for more than eight significant digits by making appropriate

changes in address arithmetic. Increasing the word length will, of course, reduce the maximum problem size that can be handled.

For those machines with floating point hardware, the program can be recompiled making appropriate modifications to floating point instructions and their associated instructions that initialize and modify instructions.

The LP20 Linear Programming System is designed to solve a general linear programming problem of the form:

Given coefficients, A_{ij} ; cost coefficients, C_{j} ; and requirements, b_{i} ; determine X_{i} to maximize

$$X_{o} = \sum_{j=1}^{M+N} C_{j}X_{j}$$
subject to
$$X_{j} \ge 0 , \quad j = 1, 2, ..., (M+N)$$
and to
$$M+N$$

$$\sum_{i=1}^{M+1} X_{j}X_{j} = b_{i} , \quad i = 1, 2, ..., M.$$

Either or both the Dual and Simplex Algorithms are used. This requires that a basic solution must be known prior to starting the problem. In order to save space, the unit vectors associated with variables in the basic solution are not stored. As a variable is dropped from the basic solution and a new variable added, the vector representing the deleted activity (in terms of the new basis) replaces the vector corresponding to the variable added to the basic solution.

If any of the b's are negative in the initial basic solution, the Dual Algorithm is used until a feasible solution is obtained or until it is determined that the problem is inconsistent. Once a feasible basic solution is obtained, the simplex algorithm is used until an optimum basic feasible solution is obtained or until it is determined that the functional is unbounded.

The Z_j - C_j row is computed for the first basic solution based on the floated C(J) values entered for both basic and nonbasic activities. A form of the revised simplex method is used subsequently so that the functional, the b's, and the $(Z_j - C_j)$'s are transformed in the same way as the Aij elements of the matrix. Therefore, the $(Z_j - C_j)$ elements will also be subject to truncation error, and it may be desirable after a long sequence of iterations to reload the Shadow Price Program to recompute the value of the functional and the $(Z_i - C_j)$ row.

In the process of matrix transformation, each element is tested after transformation to see if its exponent is less than -07 (essential zero). If it is, the element is replaced by zero. In certain problems run on predecessor programs, reasonable solutions were obtained only by increasing essential zero from -08 to -06. The field address of ESSZER is 00553 for both the Dual and Simplex Algorithms.

To illustrate the relations between various linear programming problems and the way in which they are modified to fit this programming system, several simple problems are now described.

1. Standard Simplex Problem

Maximize $X_0 = 83.40 X_1 + 72.35 X_2 + 27.30 X_3 + 72.05 X_4 + 207.25 X_5 + 455.00 X_6$ subject to $X_j \ge 0$; j = 1, 2, ..., 6and to

$$x_1 + x_2 + x_3 + 2x_4$$
 ≤ 60

$$x_2 + x_3 + 2x_4 + x_5 + x_6 \leq 60$$

$$99.4 x_1 + 37.75 x_2 + 19.75 x_3 + 54.4 x_4 + 74.75 x_5 + 53.0 x_6 \leq 2000$$

$$436x_3 + 19.1 x_5 + 12.363x_6 \leq 424$$

$$3 x_2 + .364 x_3 + 9.1 x_5 + 26.737 x_6 \leq 359$$

This problem is modified by adding disposal (slack) activities and corresponding variables X_7 , X_8 , X_9 , X_{10} , and X_{11} .

Modified Problem 1

Maximize $X_0 = 83.40 X_1 + 72.35 X_2 + 27.30 X_3 + 72.05 X_4 + 207.25 X_5 + 455.0 X_6 + 0.0 X_7 + 0.0 X_8 + 0.0 X_9 + 0.0 X_{10} + 0.0 X_{11}$

Subject to $X_j \ge 0$; j = 1, 2, ..., 11

and to

$$x_1 + x_2 + x_3 + 2 x_4 + x_5 + x_6 + x_7 = 60$$

$$x_2 + x_3 + 2 x_4 + x_5 + x_6 + x_8 = 60$$

$$99.4 x_1 + 37.75 x_2 + 19.75 x_3 + 54.4 x_4 + 74.75 x_5 + 53.0 x_6 + x_9 = 2000$$

$$.436 x_3 + 19.1 x_5 + 12.363 x_6 + x_{10} = 424$$

$$3 x_2 + .364 x_3 + 9.1 x_5 + 26.737 x_6 + x_{11} = 359$$

Finally, the unit vectors corresponding to the disposal (slack) activities are deleted in order to save storage space in the computer.

Problem (1) as stored in computer								
	Column -1	Column O	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Row -1			0001 83.40	0002 72.35	0003 27.30	0004 72.05	0005 207.25	0006 455.00
Row 0			es augus para la companya de la comp					
Row 1	0007 0.0	60.000	1.000	1.000	1.000	2.000		
Row 2	0.0 8000	60.000	Value of the state	1.000	1.000	2.000	1.000	1.000
Row 3	0009 0.0	2000.000	99.400	37.750	19.750	54.400	74.750	53.000
Row 4	0010 0.0	424.000	Parameter and the second secon		0.436	The control of the co	19.100	12.363
Row 5	0011 0.0	359.000		3.000	0.364	-	9.100	26.737

2. Feed Mix Problem, Using Dual Algorithm

Minimize
$$X_0 = 66 X_1 + 92 X_2 + 156 X_3 + 96 X_{l_1}$$

subject to X_1 , X_2 , X_3 , $X_{l_1} \ge 0$

and to

17
$$x_1 + 25 x_2 + 60 x_3 + 45 x_4 \stackrel{?}{=} 35.0$$

2 $x_1 + 5 x_2 + 7 x_3 + 0.5 x_4 \stackrel{?}{=} 1.5$
 $x_1 + x_2 + x_3 + x_4 \stackrel{?}{=} 1.0$

Modification of Problem (2).—Since the programming system assumes a maximizing problem, the objective function is multiplied by minus one so that the problem is now to maximize

$$-X_0 = -66 X_1 - 92 X_2 - 156 X_3 - 96 X_1$$

Disposal activities are added to form equations to replace the inequalities.

Maximize
$$-X_0 = -66 X_1 - 92 X_2 - 156 X_3 - 96 X_4 + 0 X_5 + 0 X_6 + 0 X_7$$

subject to $X_j \ge 0$, $j = 1, 2, ..., 7$.

and

There still is a problem since no basic feasible solution can be obtained by inspection. The solution to this problem is to multiply each equation by minus one and use X_5 , X_6 , and X_7 as the basic variables, allowing the right-hand side to be negative. The Dual Algorithm is then automatically used to derive a basic feasible solution at which time the Simplex Algorithm takes over and obtains the optimum solution. The problem, as entered into the computer, is shown on the next page.

Problem (2) as stored in computer							
	Column -1	Column O	Column 1	Column 2	Column 3	Column 4	
Row -1	to the second se	and the second s	0001 -66.0	0002 -92.0	0003 -156.0	0004 -96.0	
Row 0							
Row 1	0005 0.0	-35.0	-17.0	-25.0	-60.0	-45.0	
Row 2	0006 0.0	- 1.5	- 2.0	- 5.0	- 7.0	- 0.5	
Row 3	0007 0.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	

3. A problem stated in terms of equalities for which no obvious basic solution is available.

Maximize
$$-X_0 = -66 X_1 - 92 X_2 - 156 X_3 - 96 X_4$$

subject to X_1 , X_2 , X_3 , $X_4 \ge 0$
 $17 X_1 + 25 X_2 + 60 X_3 + 45 X_4 = 35.0$
 $2 X_1 + 5 X_2 + 7 X_3 + 0.5 X_4 = 1.5$
 $X_1 + X_2 + X_3 + X_4 = 1.0$

In this problem artificial slack variables X_7 , X_8 , and X_9 are added. In order to attempt to obtain a solution to the problem as stated, however, a large negative C_j is assigned to these three variables. If a solution exists to the problem as stated, X_7 , X_8 , and X_9 will not be in the optimum basis.

This problem, as entered in the computer, is the same as problem (2) except that for the basic activities, $C_j = 0.0$ is replaced by $C_j = -999.999$.

B. The LP20 Linear Programming System consists of a number of semi-independent routines. These are briefly described below:

LP20-1, Data Loader

This program can be used to load either of two types of data input, internal floating point format for decks previously punched by LP20-7, Matrix Punch for Restart, or row-column data prepared on a key punch. In the first case, the entire matrix is loaded. In the second case, the matrix area is first cleared and then only nonzero elements are floated and stored in specified cells.

LP20-2, Shadow Price

This program floats the C_j associated with both basic and nonbasic activities, computes the Z_j - C_j row including the value of the functional for the initial basic solution.

LP20-3, Dual

This program tests to see if the basic solution is feasible. If it is not feasible, the Dual Algorithm is used to remove infeasibilities, if this is possible. If it is already feasible, the next program, LP20-4, is loaded.

LP20-4, Simplex

This program uses the simplex method to obtain an optimum solution, if it exists. The dual and simplex programs were compiled in such a way that the matrix transformation subprogram and floating point subroutines are stored in the same locations. Consequently, these are loaded by LP20-3, and the cards pertaining to these routines are deleted from LP20-4. In effect, LP20-3 and LP20-4 are merged into a single deck in the condensed object program decks. Both programs, on sense switch control, can be halted after any iteration. Also, on sense switch control, the iteration number, value of the functional, and the ID/CJ of the entering and leaving variable are printed after each iteration.

LP20-5A, Solution Print

This program prints, for any basic feasible solution, the value of the functional, the basic solution, and shadow prices $(Z_j - C_j)$. For both of the latter cases, it prints the identification of the activity and its associated C_j .

LP20-5B, Solution Punch

This program is the same as LP20-5A, except that the information is punched in a format suitable for 80×80 listing.

LP20-6, Matrix Punch or Print

This program punches for 80 x 80 listing or prints the entire matrix in explicit decimal format. It can be used to check the initial data input or to print or punch the matrix after any iteration.

LP20-7, Matrix Punch for Restart

This program punches the matrix in floating point format for reloading by LP20-1.

LP20-8, Solution Test

This program is designed to check the accuracy of a solution by substituting the values of the basic variables into the original equations and comparing the results with the original b's. It must be used in conjunction with LP20-1 and the original data deck supplemented with data cards that cause the solution values to be loaded into row zero and column (-2), the working column. If a variable in the solution was originally a basic variable, its level is entered in the corresponding row of column (-2). If a variable was originally a nonbasic variable, its level is entered in the corresponding column of row (0). After loading the augmented data by LP20-1, the entries in column (-2) are subtracted from the corresponding entries in column (0). Then the vectors with positive levels are multiplied by their associated levels and the resulting scalar products subtracted from b, column (0). The result should be that, except for truncation error, b should be mull. This can be checked by using LP20-5A or B to print the solution.

LP20-9, Parametric Solution

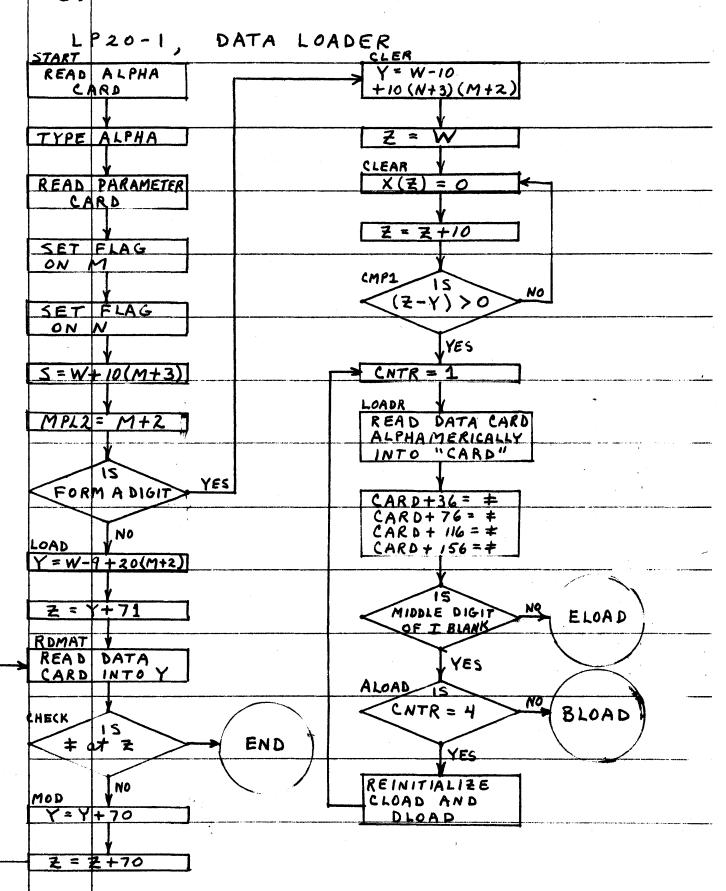
This program is used to add or subtract the largest multiple of a specified nonbasic vector to an optimum basic feasible solution such that one of the elements of the modified b is exactly zero.

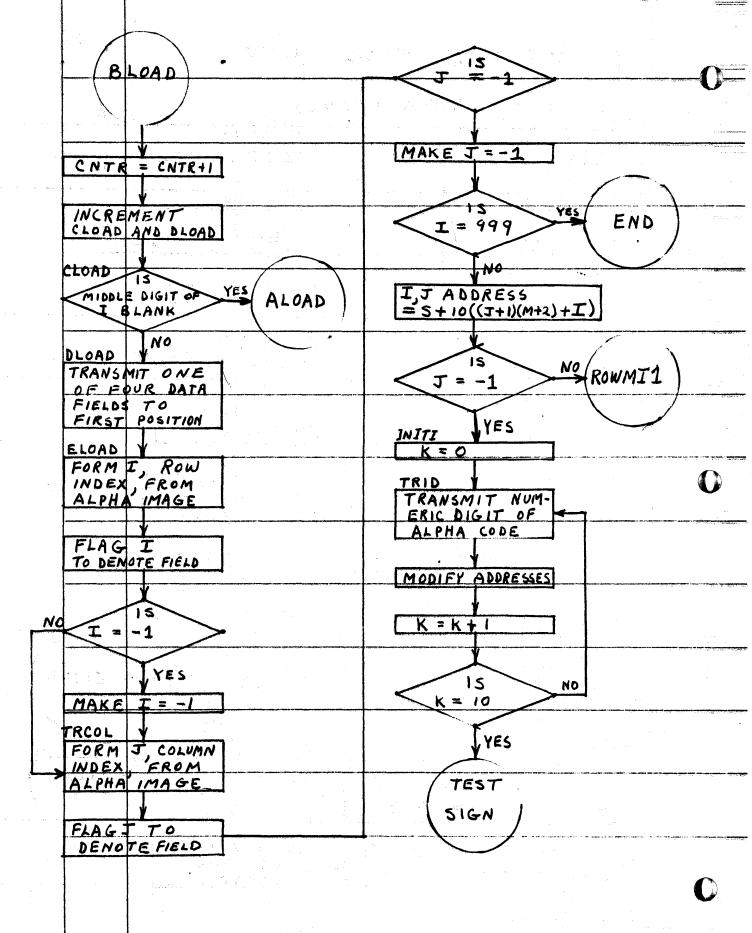
If it is planned to use parametric programming with a vector not occurring naturally in the original problem, the vector should be added to the original problem with an associated C_j such that it will not appear in the optimum solution. The program prints the value of k, the multiplier of the specified vector added to b.

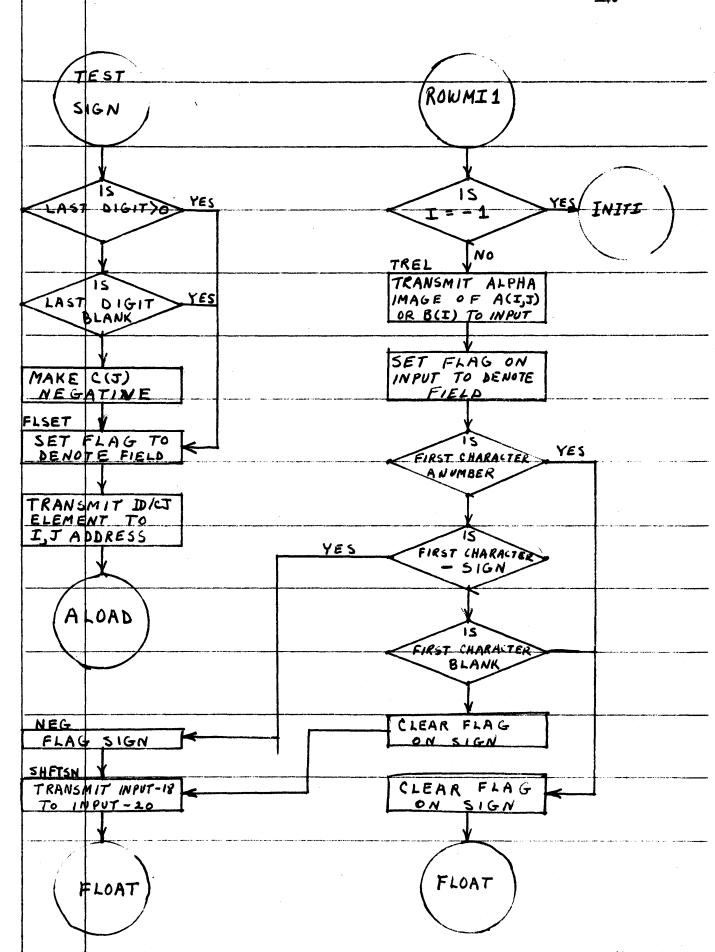
LP20-10, Parametric Dual

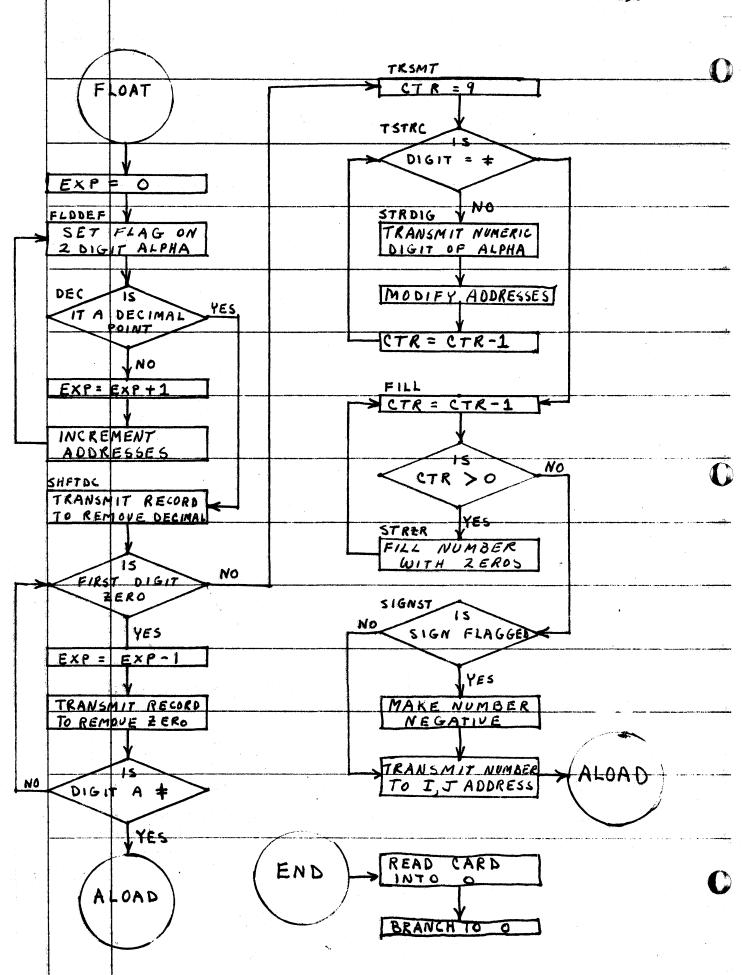
This program is essentially similar to LP20-3, except that it has been modified to select an activity at the zero level to delete from the basis rather than one at a negative level. It is also modified to do just one iteration. LP20-9 and 10 are designed to be operated in sequence as many times as desired.

C. DETAILED FLOW CHARTS

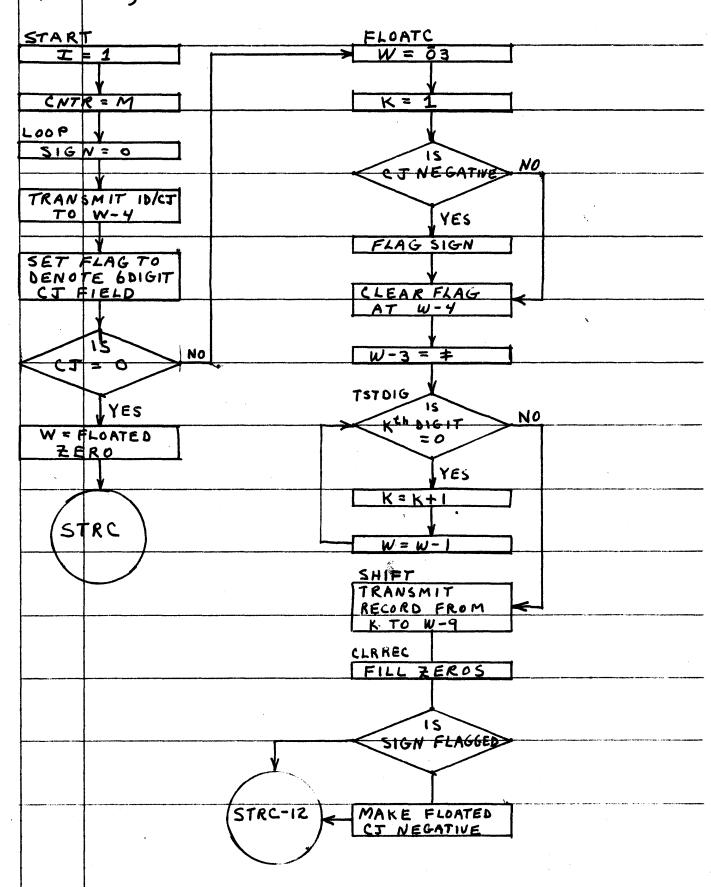


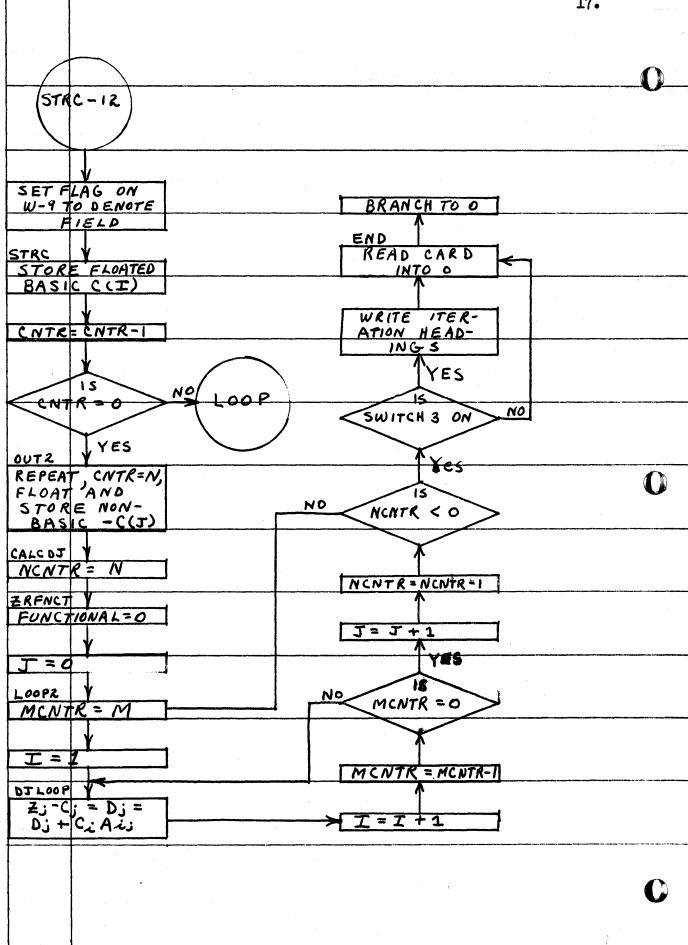


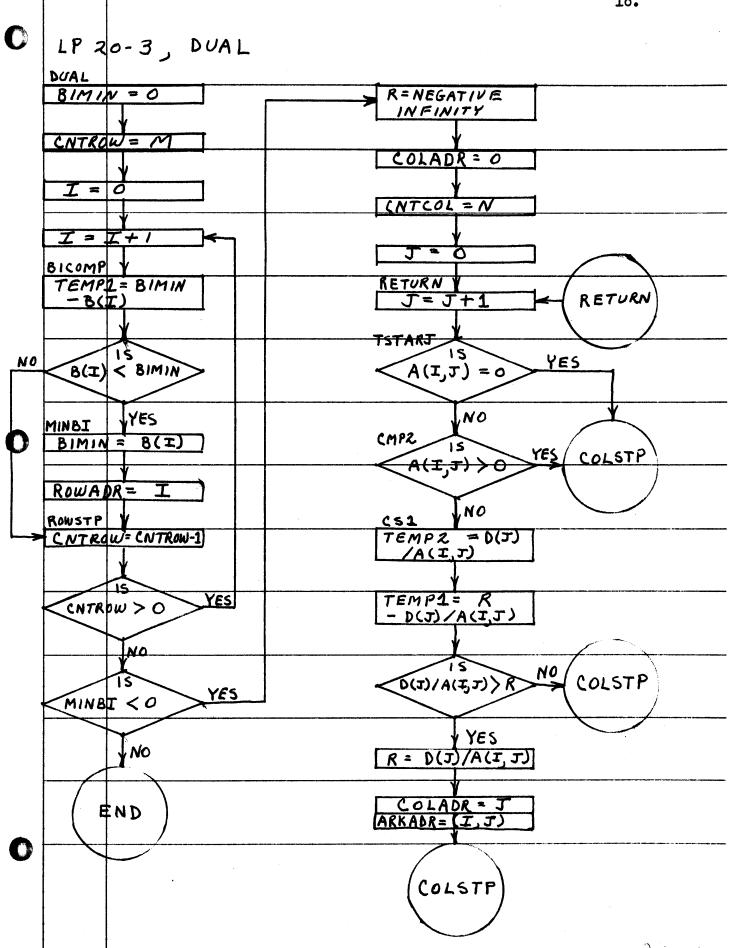


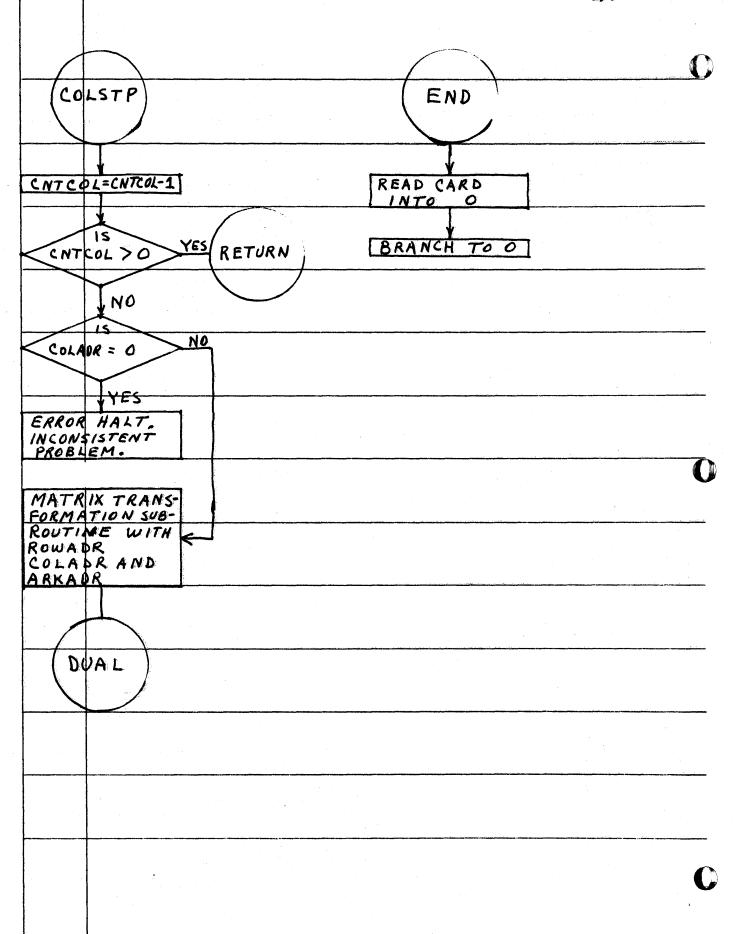


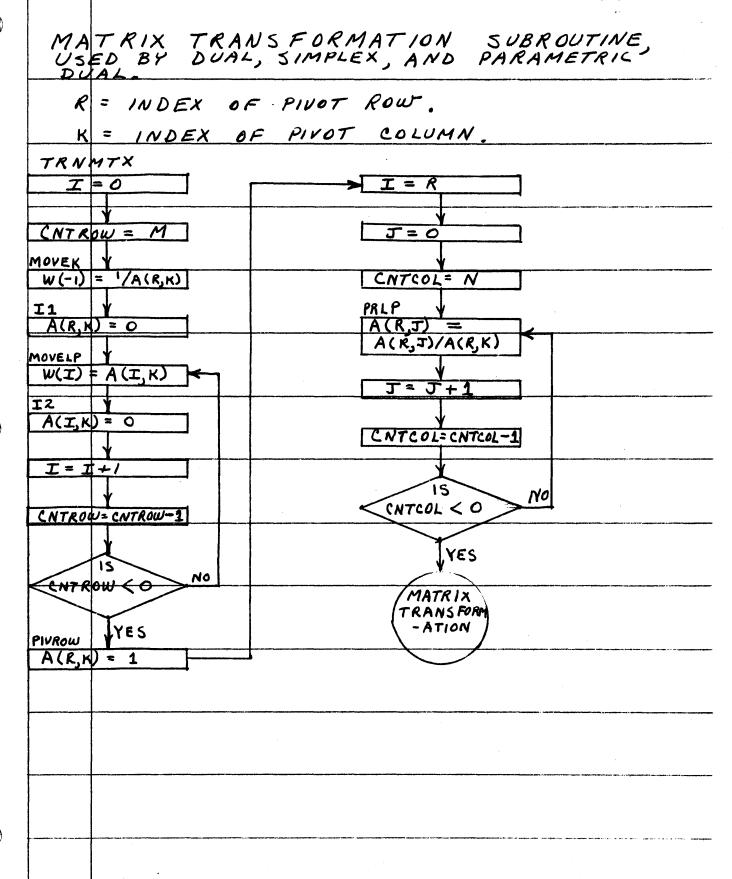
LP20-2, SHADOW PRICE

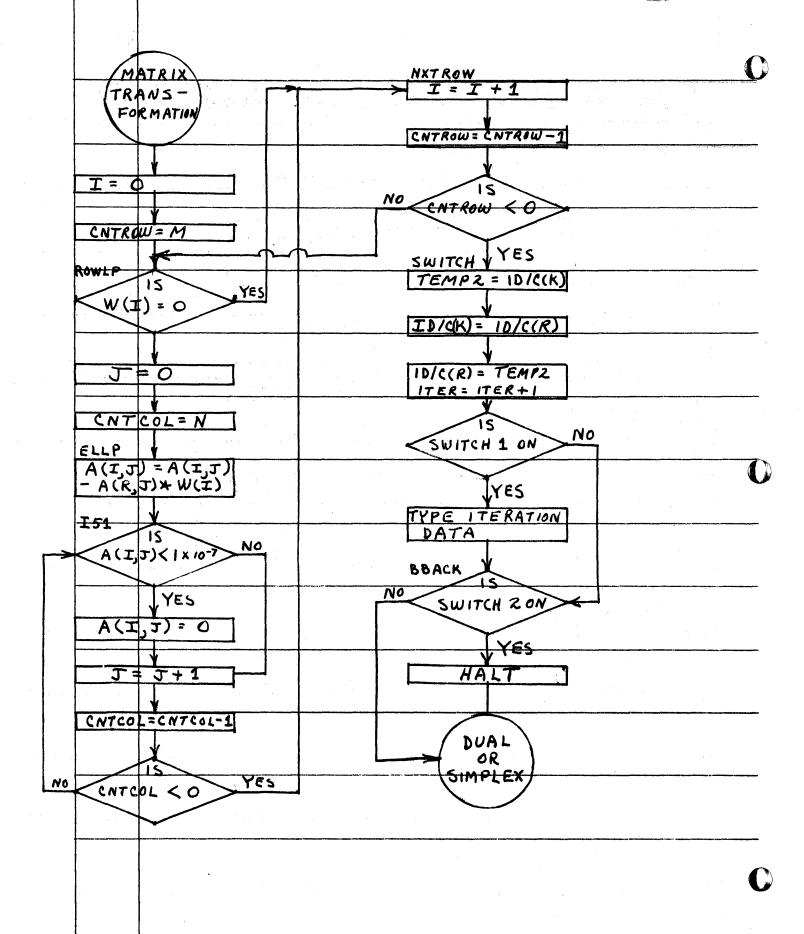


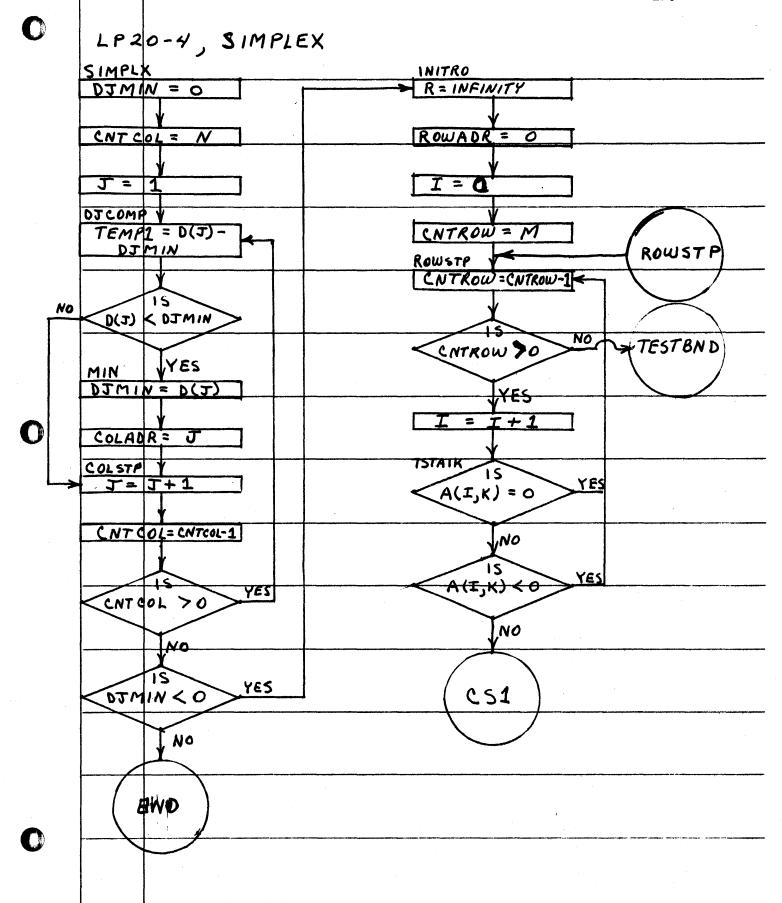


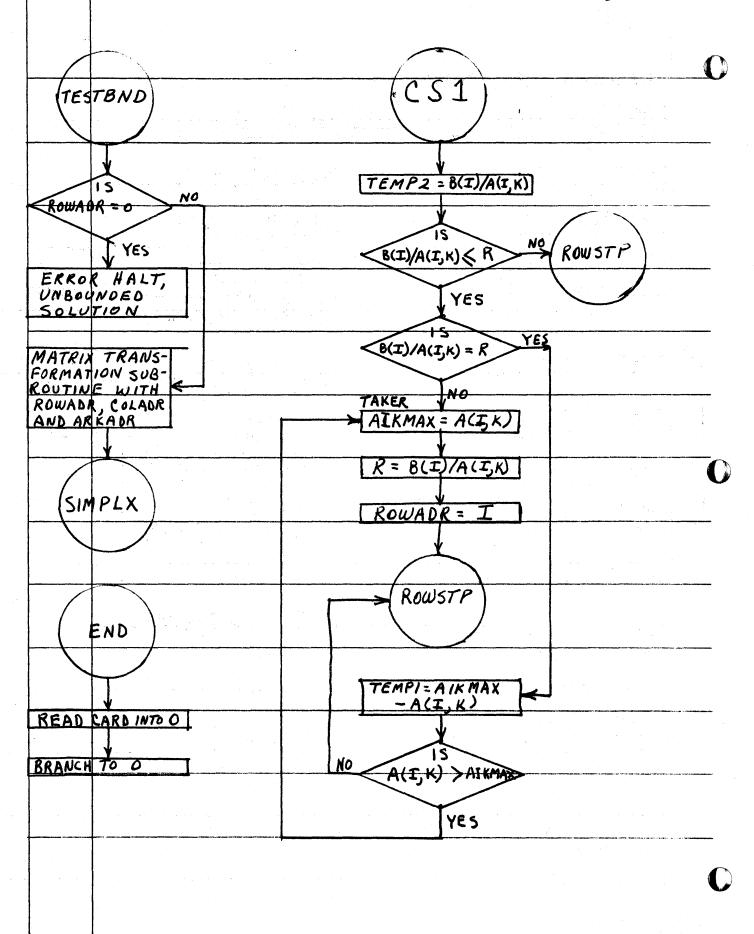


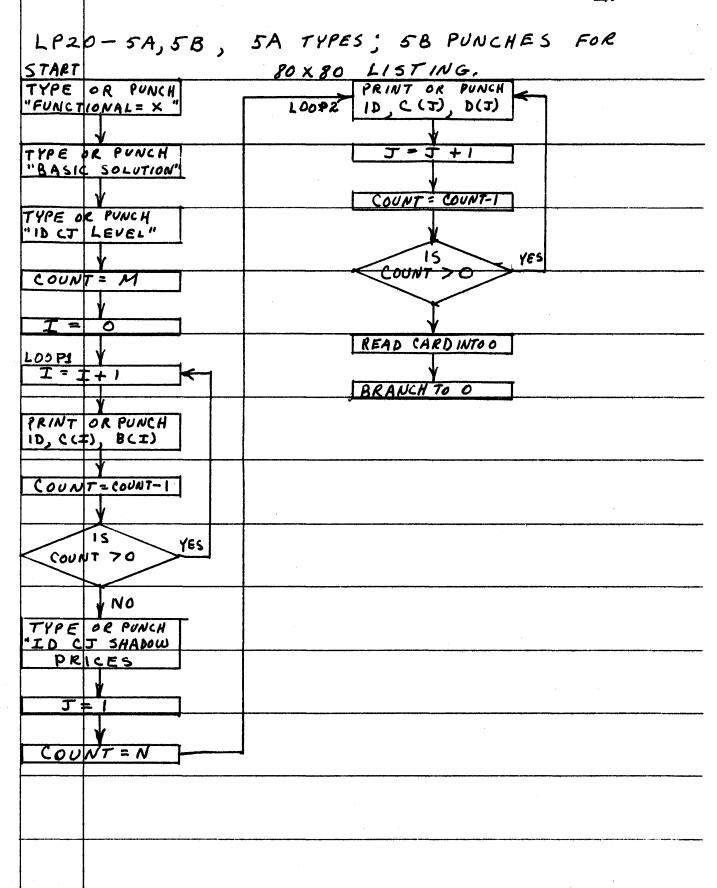


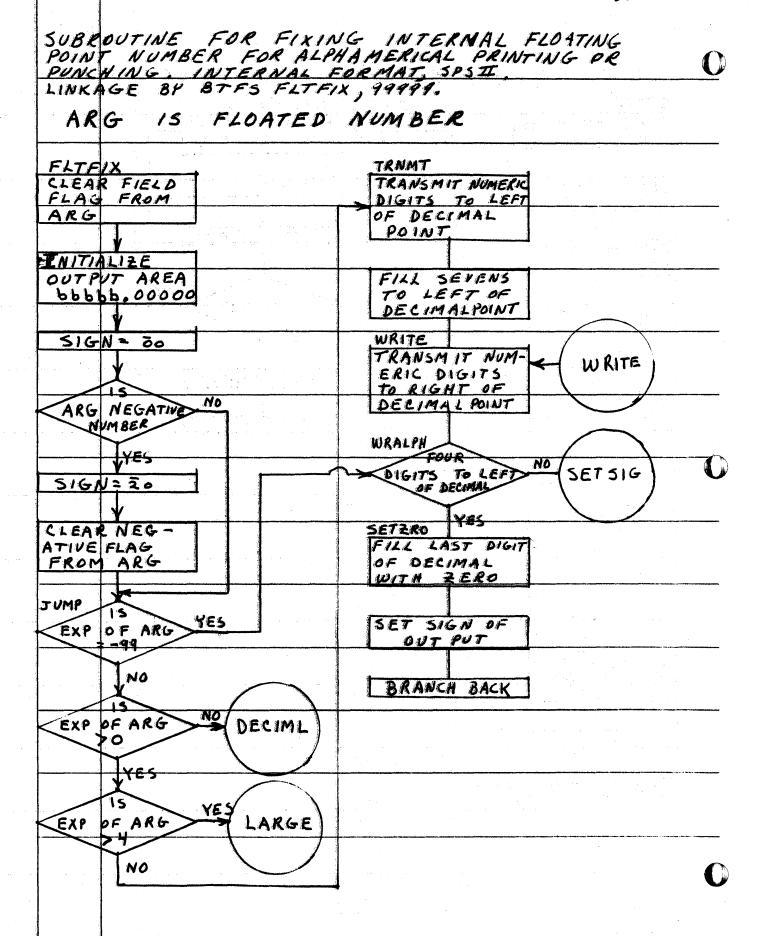


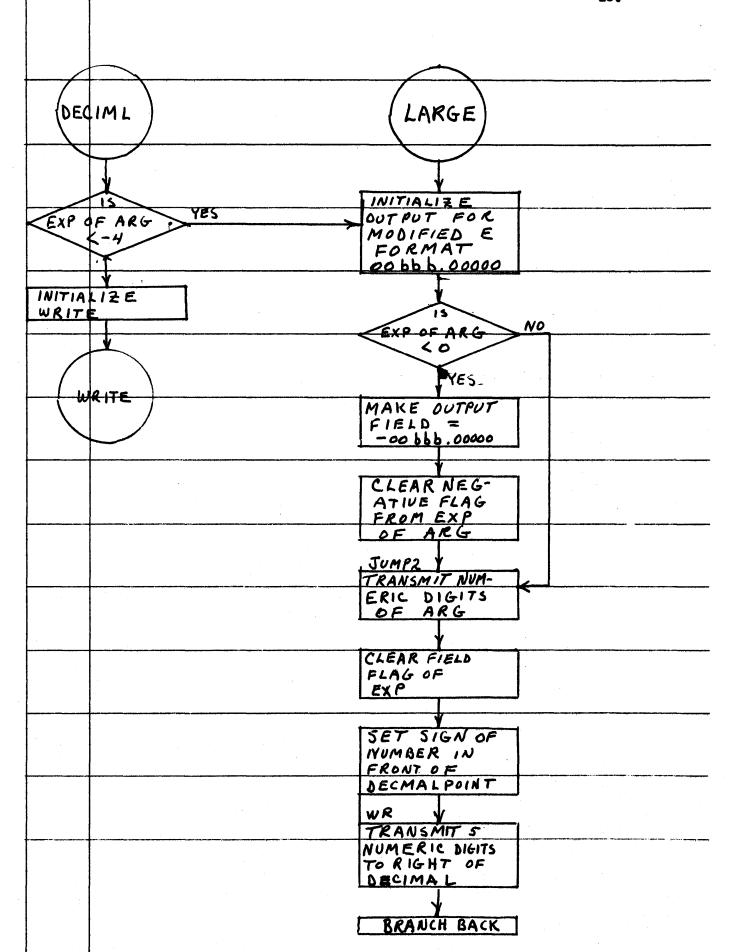


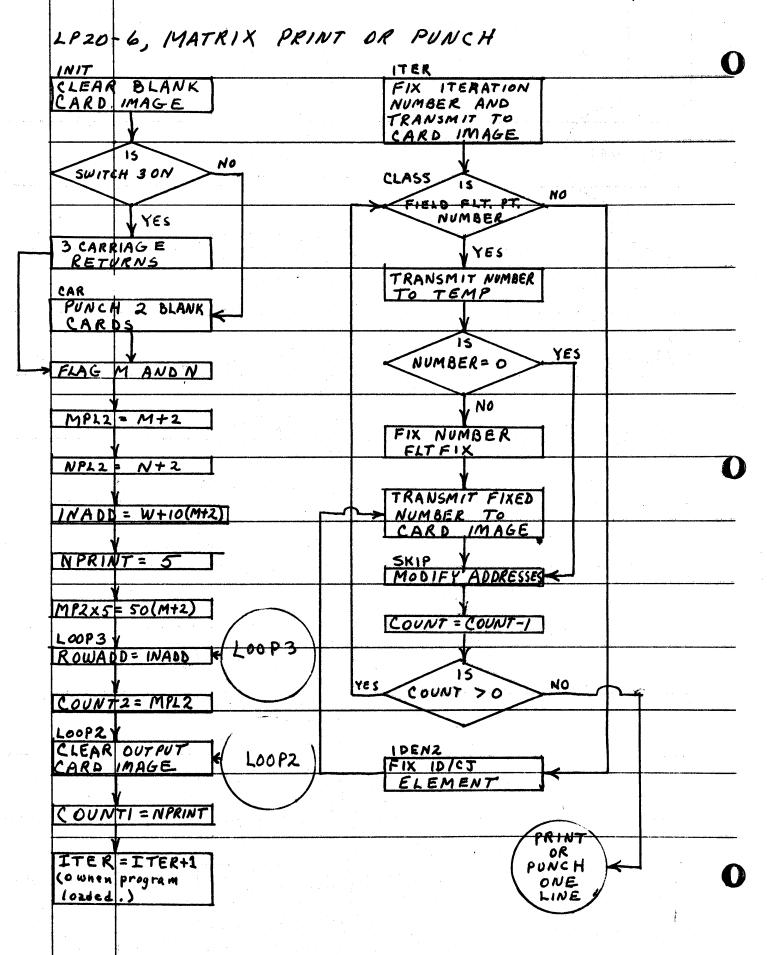


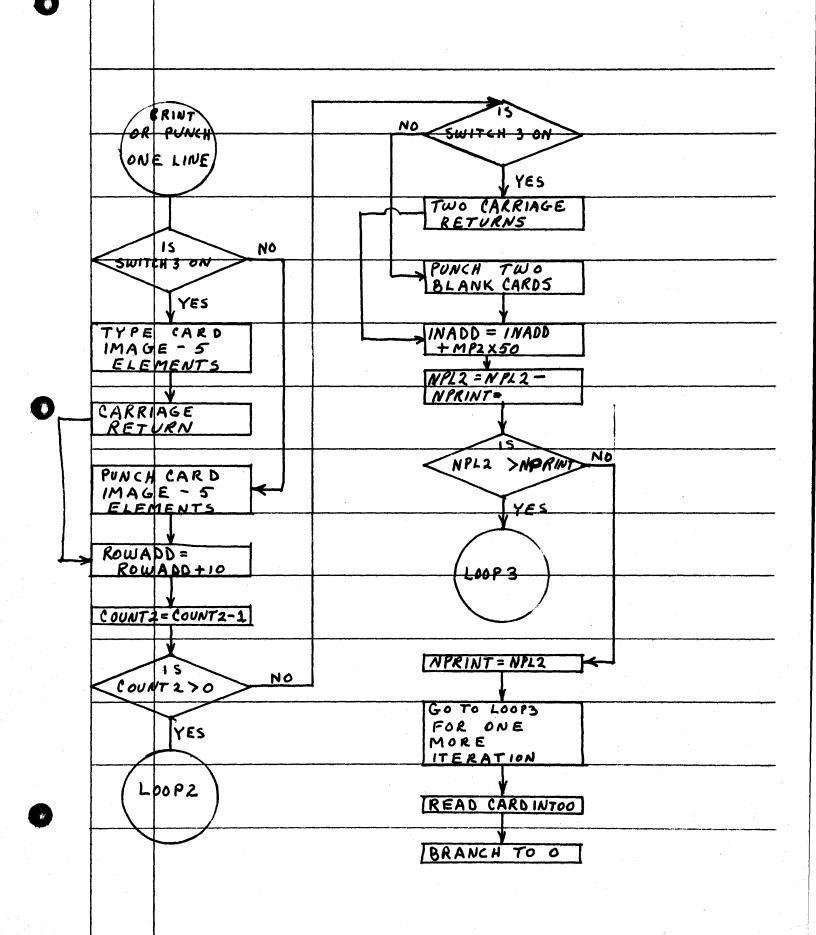




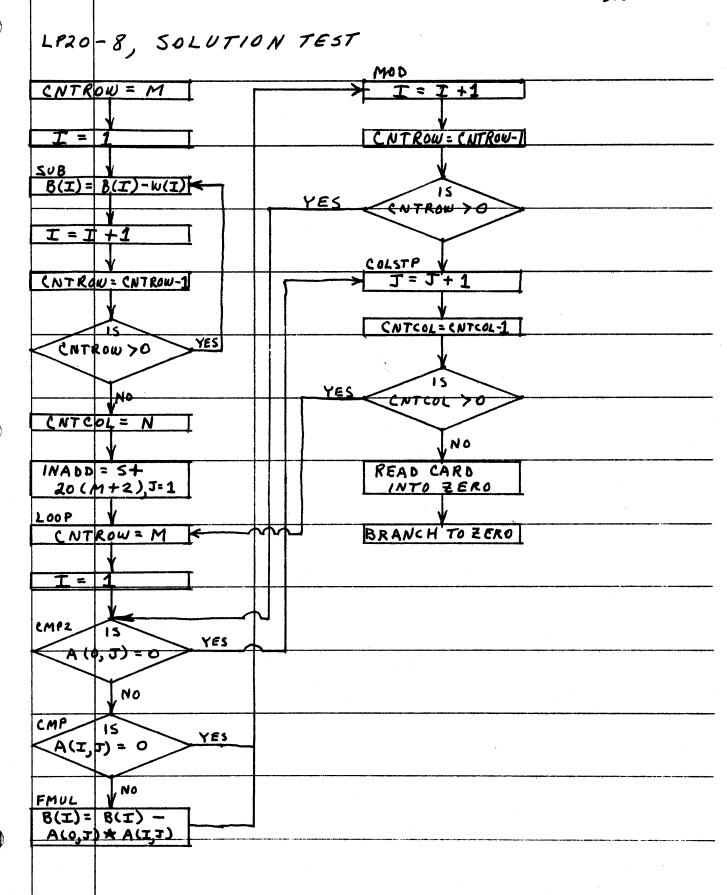


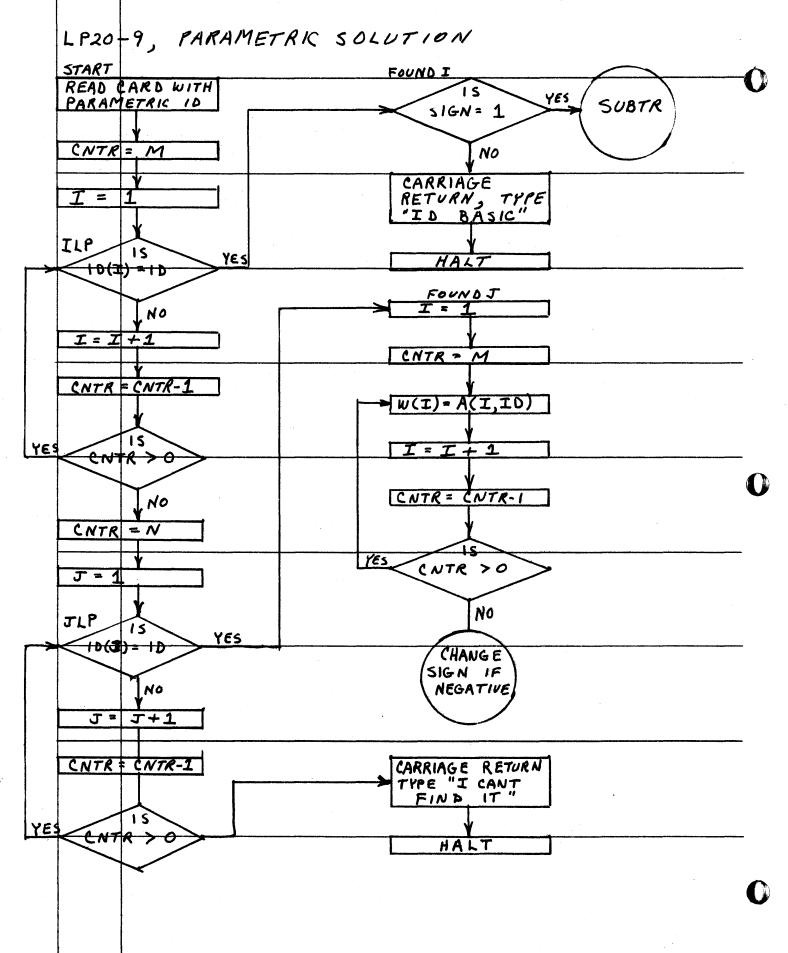


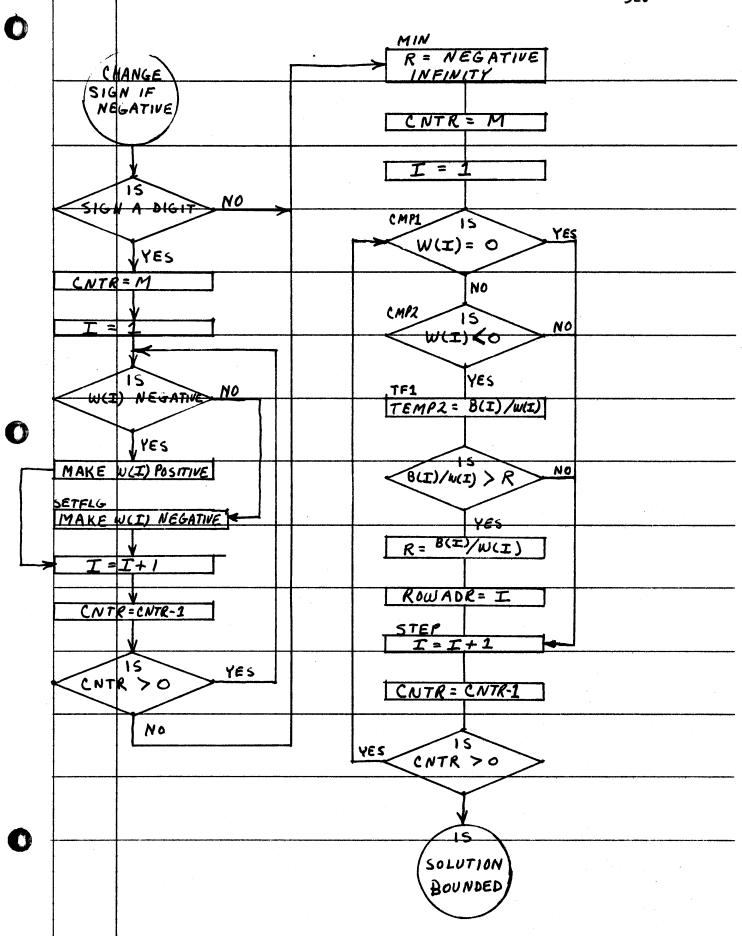


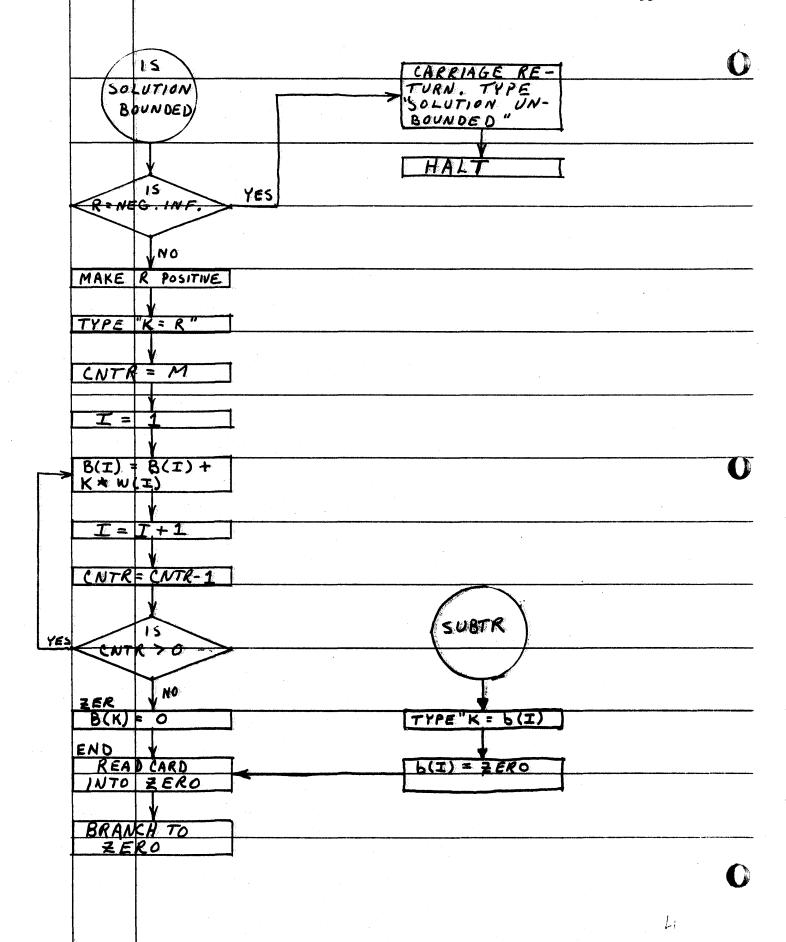


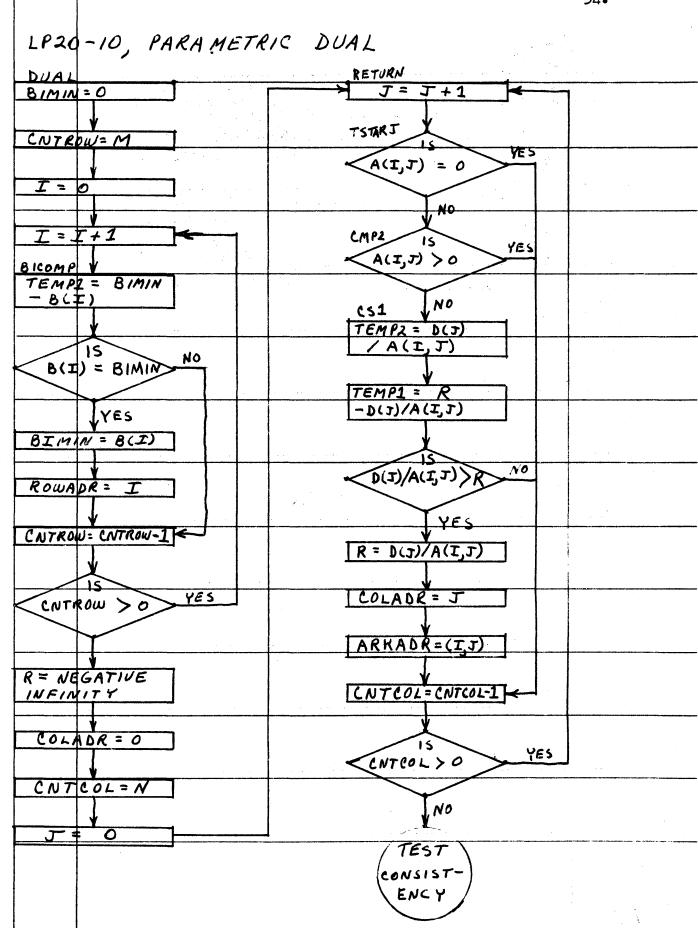
FORM =	0.				
FLT, P	T. FOR-				\$ - 2 - 1 - 1 - 1
PUNCH	PAR - 1				
AMETE	RCARD	Assertion 1995			
(CMP2+11)	y = 5+				
10 (N+2)	(M+2)-2				
(CMP+11)	= (CMP2+11)				
-70	J				
ADDRES	SS =				
W-9+10(M+1)				· .
	15				
ADDRES	55 > YES	TO ADDRESS	F		engan pinangan pangan pang
WRITE	INO	+ 7/			
PUNCHO	NE CARD				
FROM A	DBKE33				
ADDRES	5 =			·	4
MUNA.	T				
	y				
CMP2	S		**************************************	:	
CMP2 1					
CMP2 1	\$\$ >				
CMP2 1	\$\$ > P2+11 (ARD				
CMP2 ADDRE CM READ INTO 5	SS > P2+II V (AR D 2ERO				3
CMP2 I	SS > P2+II V (AR D 2ERO				



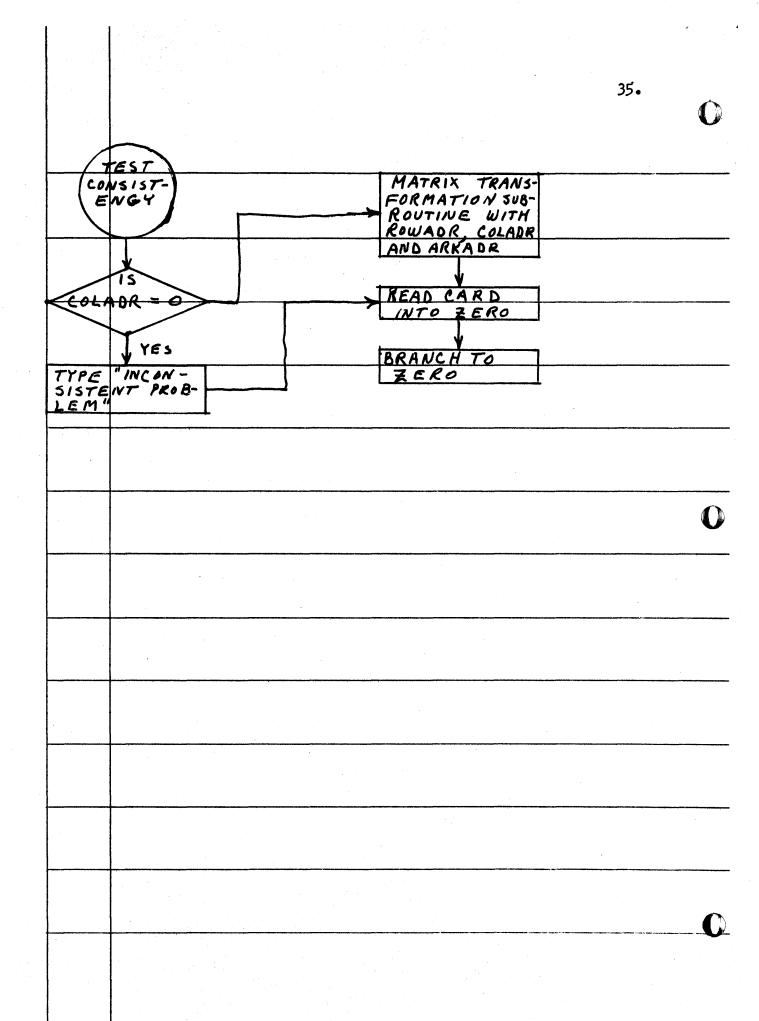








O



II. Input-Output Format

A. Input format for data

1. Internal floating point format as punched by LP20-7. See page 41 for detailed description of cards. A single alphameric card must be added to the deck punched by LP20-7.

2. Row-column format

- a. First data input card. The first card is used for problem identification. Any alphameric information may be punched in columns 1-80. A record mark (0-2-8 multiple punch) may follow the alphameric field but is not necessary. This card is read alphamerically and printed on the typewriter.
- b. Second data input card. This card is a parameter card and must contain the following information:

Columns	Information	Example
1-3	M, the number of restrictions.	005
4	Blank.	43 M
5 - 7	N, the number of nonbasic variables.	006
8	Blank.	<u>,</u>
9	Input format.	
	l for row-column, fixed point input.	
	O for a complete (including zero elements) internal floating point matrix. (Normally	
	only used as punched out by LP20-7, Matrix Punch for Restart.)	

c. The data, following the cards specified under (a) and (b), are in row-column, fixed point format. Up to four elements with row-

column designations may be entered on each card. A brief tabular description of row-column designations is in order. The matrix is stored by columns with the reference field address, W, corresponding to row (-1) and column (-2).

				Colum	ns		
Rows	-2	-1	0	1	2	3	N
-1	W				Nonbas	ic ID/CJ	
0	ā		Function		(Z _j	– Շ յ) ։	,
1 2	column	छ/ व					
	Working	sic	bi		•	A ij	
M	€	8					

ID/CJ stands for a single 10-digit field where the first four digits are an arbitrary identification (ID) of the activity and the next six digits are the associated C_j. Identifications do not need to be sequential. In row (-1) and columns (1) through (N), an ID/CJ element is necessary. In column (-1) and rows (1) through M, an ID/CJ element is necessary. In rows (1) through (M) and columns (0) through (N) only nonzero elements need to loaded.

Row (0) and column (-2) are used for input only in connection with LP20-8, Solution Test.

In general, the format is as follows:

There are four fields per card for data:

i j element

TXXbXXXXXXXXXXXX where b stands for a blank column.

	Columns for i	Columns for j	Columns for element
Field 1	1- 3	5- 7	9-18
Field 2	21-23	25-27	29-38
Field 3	41-43	45-47	49-58
Field 4	61-63	65-67	69-78

All other columns are not used by the program and may be used for any other purpose. These cards are read <u>alphamerically</u>. Consequently, a blank does <u>not</u> enter as zero (70) but as an alphameric blank (00).

Any field that has the middle digit of the three digit i value left blank will be ignored. Hence, data cards do not have to have a complete set of four elements, nor is it required that a left-hand field be used in order to use succeeding fields on the same card. Matrix elements, b_i, and A_{ij}, may contain up to eight numeric digits with optional <u>leading</u> sign and <u>mandatory</u> decimal point. If the element is negative, an explicit minus sign must be punched in the <u>first</u> column provided, columns 9, 29, 49, or 69. Loading of zero elements is optional.

The signal to the data loader to quit loading is a three digit value of i = 999. This must be in the last data card to the right (if other elements are on the card) of the last element. The simplest procedure is to use a trailer card with 999 punched in columns 1-3.

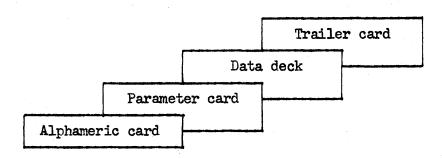
Specific Description of Fields

Item	Description	Row-Column Remarks-Examples	
		i j	
A _{i,j}	Matrix element of the ith row and jth column.	XXX XXX i j element 010 004 36.075 003 004 -4.0 008 017 -0.6 008 0176	
		i j	
b _i	Element in the 1th row of the requirement	XXX 000 008 000 6.025	
	vector.	i j	
C _i	Cost per unit of the basic vari- able for row i. j = 00I = 00J	XXX 00J 012 00J 0003001500)
	where J is a flagged one.	i j	
c _j	Cost per unit of jth nonbasic vari- able. i = 001 = 00J where J is a flagged one.	00J XXX 00J 024 0034123456	ı

For the ID/CJ elements, no explicit decimal points are used. An implicit decimal is assumed in the middle of the six digit CJ field. Negative costs are designated by a flag over the units' position of the CJ field.

Examples	Interpretation	
012 00J 0003001500	Row (12)	
	Column (-1)	
	x ₃	
	c ₃ = 1.5	
001 024 0034123456	Row (-1)	
	Column (24)	
	x _{3l} ı	
	c ₃₄ = -123.456	

3. Summary of data load input for row-column, fixed point input.



4. To prepare data for LP20-8, Solution Test, additional data cards are prepared to load the solution into row (0) and column (-2). The levels of originally basic activities are entered in the corresponding rows of column (-2). The levels of originally nonbasic activities are entered in the corresponding columns of row (0). The format is the same as that used for A_{ii} and b_i.

Examples

i j

000 034 36.702589 010 002 43.256943

where the nonbasic activity corresponding to the level of 36.702589 was originally stored in column 34, and the basic activity corresponding to the level of 43.256943 was originally stored in row 10.

The original data deck, with the new cards containing the levels of basic and nonbasic variables inserted prior to the trailer card serves as imput to LP20-1 followed by LP20-8 to test the solution.

which the ID of the parametric vector is punched in columns 1-4 and a 1 is punched in column 6 if the vector is to be subtracted from the b vector. If column 6 is blank, the parametric vector will be added to b.

B. Output format

The only card output that requires detailed description is that of LP20-7, Matrix Punch for Restart.

The first card is punched from location 402 and contains in columns 1-3, M; in columns 5-7, N; a zero in column 9 indicating floating point format; the reference address, S, in columns 10-14; M + 2 in columns 15-17. Other columns of this header card will be punched, but the information contained in them is not essential. The remaining cards contain the entire matrix by columns starting in row (-1) and column (-1) with seven 10-digit fields per card. The fields are either internal floating point or ID/CJ elements. The last card contains a record mark in column 72. Columns 71 to 80 may be punched but do not contain useful information.

The punched output from LP20-5B and 6 is the same as the typed output from LP20-5A and 6. It is suitable for 80 x 80 listing, contains alphabetic headings, and uses explicit decimal format. The float routine prepares most numbers with up to four digits to the left of the decimal and five to the right. If the number is negative, a negative sign precedes the first digit. If the numbers are larger than 9999.99999 or smaller than 0.00010, a modified E format is used with the two digit exponent preceding the mantissa.

For example: $\pm 05 \pm .953 \mu 2$, which indicates the number, $\pm 0.00000953 \mu 2$ if the leading sign is negative or $\pm 953 \mu 2.0$ if the leading sign is positive. C. Object deck format

Two sets of object decks are provided. One set was condensed by the SPSII compiler while the other was further condensed by a routine similar to Squeez. The first six and the last four cards serve as program loader and contain the add and multiply tables. The remaining cards have a

standard format. The first five columns contain a flagged address to which the digit in column 8 will be transmitted. Columns 6 and 7 contain a flagged number indicating how many digits are to be transmitted.

This condenser has been designed to be used in chained programs where the memory is not cleared prior to loading. The flagged number indicating how many digits are to be transmitted allows one to control the loading in areas where parameters have been stored by previous programs so that they are not destroyed. All program cards with the five digit leading address are read into a fixed location and, starting with column 8, the required number of digits are transmitted to the specified and higher addresses.

LP20-1 has a two card clearing routine independent of memory size prior to the six card loader.

Except for the first six and last four cards, the leading five digit address serves as a sequence number, although sequence is not important.

用
 DAMPLE
てスクロトロスし

SAM		F DATA CARD OBLEM , LP2		SIMPL	.EX.							JE.
001 002 002 003 004	001 1. 002 1. 006 1. 004 54 005 19	.0 .0 +.4 9.1	003	003 001 005 006	1.0 99.4 74.75 12.363	002 003 003		2.0 37.75 53.0	002 003 004	003		FOR DA PAGES
001	005 9. 00J 00	007			26.737 0008	003	00J	0009	004	00J	0010	4
001	001 00	0010834			000207235 0006455	007	003	00030273	001	004	000407205	700
001	000 60	0.0			60.0	003	000	2000.0	004	000	424.0	-1881- CK 1.3
												S
SAM	PLE PRO	OBLEM, LP20), SI	MPLE	X, TEST SOLU	10 I T L	١.	ė.				7
005 001 002 002 003 004	006 1 001 1. 002 1. 006 1. 004 54 005 19	.0 .0 .0 +.4 9.1	001 002 003 003 004	002 003 001 005 006	1.0 1.0 99.4 74.75 12.363	001 002 003 003	003 004 002	2.0 37.75 53.0	002 003 004	003		ines,
005 001 002 002 003 004 005 001	006 1 001 1. 002 1. 006 1. 004 54 005 19 005 9.	.0 .0 .0 +.4 9.1 .1	001 002 003 003 004 005	002 003 001 005 006 006	1.0 1.0 99.4 74.75	001 002 003 003 005	003 004 002 006 002	2.0 37.75 53.0	002 003 004 005	005 003 003 003	1.0 19.75 0.436	SSE
005 001 002 002 003 004 005 001 005	006 1 001 1. 002 1. 006 1. 004 54 005 19 00J 00 00J 00	.0 .0 .0 4.4 9.1 .1 007 011	001 002 003 003 004 005 002	002 003 001 005 006 006 00J	1.0 1.0 99.4 74.75 12.363 26.737 0008	001 002 003 003 005	003 004 002 006 002	2.0 37.75 53.0 3.0	002 003 004 005	005 003 003 003	1.0 19.75 0.436 0.364	S
005 001 002 002 003 004 005 001 00J 00J	006 1 001 1. 002 1. 006 1. 004 54 005 19 00J 00 00J 00	.0 .0 .0 4.4 9.1 .1 007 011 0010834 00520725	001 002 003 003 004 005 002	002 003 001 005 006 006 00J	1.0 1.0 99.4 74.75 12.363 26.737 0008	001 002 003 003 005 003	003 004 002 006 002 00J	2.0 37.75 53.0 3.0 0009	002 003 004 005 004	005 003 003 003 00J	1.0 19.75 0.436 0.364	SSE

LINEAR PROGRAMMING TEST	PROBLEM. DUAL.	FEED MIX.		
003 004 1 001 001 -17.0 001 002 001 -2.0 002	002 -25. 0 002 -5. 0	001 003 -60.0 002 003 -7.0 003 003 -1.0	001 004 -45.0 002 004 -0.5 003 004 -1.0	
00J 001 000106600- 00J	002 000209200- 000 -1.5 00J 0006000000	00J 003 000315600- 003 000 -1.0 003 00J 0007000000	00J 004 000409600-	

NOTE: TRAILING MINUS SIGN IS A FLAGGED ZERO, O.

F

SAMPLE PROBLEM , LP20, SIMPLEX.

CJ

000.000 072.350 027.300 000.000 207.250 000.000

ID

ITER		FUNCTIONAL	VAR IN	VAR OUT
0001 0002 0003		6109323604 7190305404 7805220104	0006455000 0001083400 0004072050	0011000000 0009000000 0008000000
FUNCT	IONAL = 78	05.22010		
BASIC	SOLUTION			
1 D	CJ	LEVEL		
0007 0004 0001 0010 0006	000.000 072.050 083.400 000.000 455.000	13.20997 23.28645 .21711 258.00095 13.42708		

SHADOW PRICES

.83903 17.10861 7.88345 13.20327 3.90254 14.86060

OPTIMUM SOLUTION MATRIX, SIMPLEX PROBLEM.

		7805.22010	0009 000.000		0003 027.300 7.88345	001 002	
0007	000.000	13.20997	01006		.09209	003	
0004	072.050	23.28645		.44389	.49319	004	
0001	083.400	.21711	.01006		07848	005	
0010	000.000	258.00095		-1.38717	.26768	006	
0006	455.000	13.42708		.11220	.01361	007	
0008	000.000	0005 207.250	0011 000.000			800	
<u> </u>	13.20327	3.90254	14.86060	· · · · · · · · · · · · · · · · · · ·	The second secon	009	
	72635	-1.04967	.04710		· .	010	
	.50000	. 32 982	01870			011	*
	27364	.39002	00970			012	
		14.89222	46239			013	
		. 34035	.03740		The second secon	014	

SAMPLE PROBLEM, LP20, SIMPLEX, TEST SOLUTION.

FUNCTIONAL:	.00000	
BASIC SOLUT	ION	
ID CJ	LEVEL	
0007 000. 0008 000. 0009 000. 0010 000. 0011 000.	000 -05 .10000 000 .00050 000 .00000	TRUNCATION ERROR.
ID CJ	SHADOW PRICES	
0001 083. 0002 072. 0003 027. 0004 072. 0005 207. 0006 455.	350 .00000 300 .00000 050 23.28645 250 .00000	LEVELS OF NONBASIC ACTIVITIES IN OPT- IMUM SOLUTION

```
PROGRAMMING, SIMPLEX.
                PAKAMET RIC
                 (WORKING CAPITAL = # 2000 + 1313,07 = # 3313.07)
K = 1313071004
                   (ID OF PARAMETRIC VECTOR = 0009)
ITER
                    FUNCTIONAL
                                     VAR IN
                                                      VAR OUT
                     8906931604
                                    0005207250
0001
                                                    0007000000
FUNCTIONAL = 8906.93160
BASIC SOLUTION
ID
       CJ
                       LEVEL
0005
       207.250
                         -.00000
0004
       072.050
                        23.28645
0001
       083.400
                        13.42708
0010
       000,000
                       258.00095
0006
       455.000
                        13.42708
ID
       CJ
                  "SHADOW PRICES
0009
                          .80163
       000.000
0002
       072.350
                        17.23944
0003
       027.300
                         8.22585
8000
       000,000
                        10.50278
0007
       000,000
                        3.71784
       000,000
0011
                        15.03574
                (WORKING CAPITAL = $3313.07+$1807.61 = $5120.68)
K = 1807605904
                   FUNCTIONAL
                                     VAR IN
                                                      VAR OUT
ITER
0001
                    1035596505
                                    0000008000
                                                    00000000
FUNCTIONAL = 05 .10355
BASIC SOLUTION
ID
       CJ
                      LEVEL
0005
       207.250
                        17.32454
0004
       072.050
                        17.57241
       083.400
                        24.85517
0001
8000
       000.000
                         -.00000
0006
       455,000
                         7.53063
       CJ
                  SHADOW PRICES
ID
0009
       000.000
                          .65616
0002
       072.350
                        16.33450
       027.300
                         9.83036
0003
0010
       000,000
                         1.01917
0007
       000,000
                        18.17735
```

0011

000.000

15.24566

```
(WORKING CAPITAL = $5120.68+ 2537.46 = $7658,14)
K = 2537456304
                                                      VAR OUT
                                     VAR IN
                   FUNCTIONAL
ITER
                                                    0004072050
                     7202095105
                                     000000000
0001
FUNCTIONAL =
             05
                   .12020
BASIC SOLUTION
                       LEVEL
       CJ
ID
       207.250
                        17.32454
0005
                         -.00000
       000.000
0009
                        59.99999
0001
       083.400
                        35.14482
8000
       000.000
                         7.53063
0006
       455.000
       CJ
                   SHADOW PRICES
I D
                        94.75001
0004
       072.050
                        57.22286
0002
       072.350
                        63.23612
       027.300
0003
                         3.51792
       000.000
0010
                        83.40000
       000.000
0007
                        15.39095
       000.000
0011
                                            BASIS.)
             (ACTIVITY
                          0009
ID BASIC.
                                 NOW IN
```

FINAL MATRIX AFTER PARAMETRIC PROGRAMMING

0005 0009 0001 0008 0006	207.250 000.000 083.400 000.000 455.000		0004 072.050 94.75001 -144.40001 2.00000 1.99999	0002 072.350 57.22286 09314 -62.31428 1.00000 .94924 .14390	027.300 63.23612 .01797 -81.39093 1.00000 .97452 .00749	001 002 003 004 005 006 007
0010	000.000 3.51792 .06714 -3.80811 04429 02285	0007 000.000 83.40000 -0710000 -99.39999 1.00000 -0610000 -07 .10000	0011 000.000 15.39095 03104 22142 01691 .04796			008 009 010 011 012 013 014

LINEAR PROGRAMMING TEST PROBLEM. DUAL. FEED MIX.

ITER	FUNCTIONAL	VAR IN	VAR OUT
0001	7466666502	0004096000	0005000000
0002	7957894702	0003156000	0006000000
0003	8678480 <u>9</u> 02	0002092000	0007000000
0004	8764583302	0001066000	0003156000

FUNCTIONAL = -87.64583

BASIC SOLUTION

ID	CJ	LEVEL
0004	-096.000	.60416
0001	-066.000	.26041
0002	-092.000	.13541
I D	CJ	SHADOW PRICES
0003	-156.000	6.80209
0007	000.000	32.98958
0006	000.000	5.08333
0005	000.000	1.34375

OPTIMUM MATRIX, DUAL FEED MIX PROBLEM.

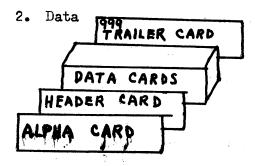
0004 0001 0002	-096.000 -066.000 -092.000	0003 -87.64583 .60416 .26041 .13541	-156.000 000 6.80209 .92708 -2.05729 2.13020	7 000.000 0006 32.98958 .36458 -2.21354 .84895	000.000 5.08333 .08333 .20833 29166	001 002 003 004 005
0005	000.000 1.34375 03124 .04687 01562					006 007 008 009 010

IV. Operating Instructions.

Each of the programs is designed to operate semi-independently. Each has as its last executed instructions a simulate load sequence, read numeric card into location zero, and branch to zero. In the condensed object deck, the programs do not halt at the conclusion of loading the program but branch immediately to the first instruction.

A. Main sequence.

1. LP20-1, Data Loader



3. LP20-2, Shadow Price

	. 1	<u>On</u>		1	1.9	$\underline{\text{Off}}$
Sense Switch 1	Print	iteration	headings		No	print

4. LP20-3 and 4, Dual and Simplex

	<u>On</u>	<u>Off</u>
Sense Switch 1	Print iteration number, functional, variable in, and variable out	No print
Sense Switch 2	Halt after complete itera- tion	No halt

This halt allows the problem to be stopped in midstream to obtain a matrix print or punch (LP20-6), a solution print or punch (LP20-5A or B), or a matrix punch for restart at some later date (LP20-70.

If the dual program is used (an infeasible initial basic solution), an inconsistent problem will lead to an error halt at 02426. If an unbounded solution is found by the simplex program, an error halt occurs at 02608.

The only other error halts are those connected with the floating point subroutines. Here the operator has a choice as to action depending upon the digit stored in OO401. The last digit of card six in the condensed object decks corresponds to OO401 and may be modified to suit the operator's choice of action. In the version distributed, a zero appears at this location which causes a halt when any floating point error is detected.

5. LP20-5A or 5B, Solution Print or Solution Punch

These programs are essentially the same except that 5A types the solution and 5B punches the solution for 80×80 listing.

6. LP20-6, Matrix Print or Punch (Optional)

On Off

Sense Switch 3 Types matrix Punches matrix

7. LP20-7, Matrix Punch for Restart (Optional)

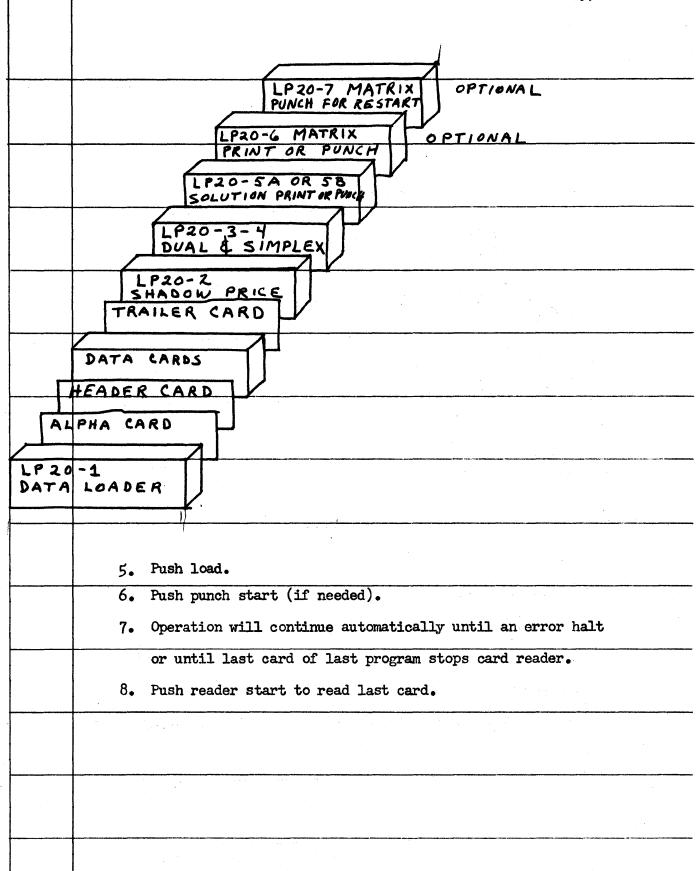
To summarize the operation of the main sequence of programs:

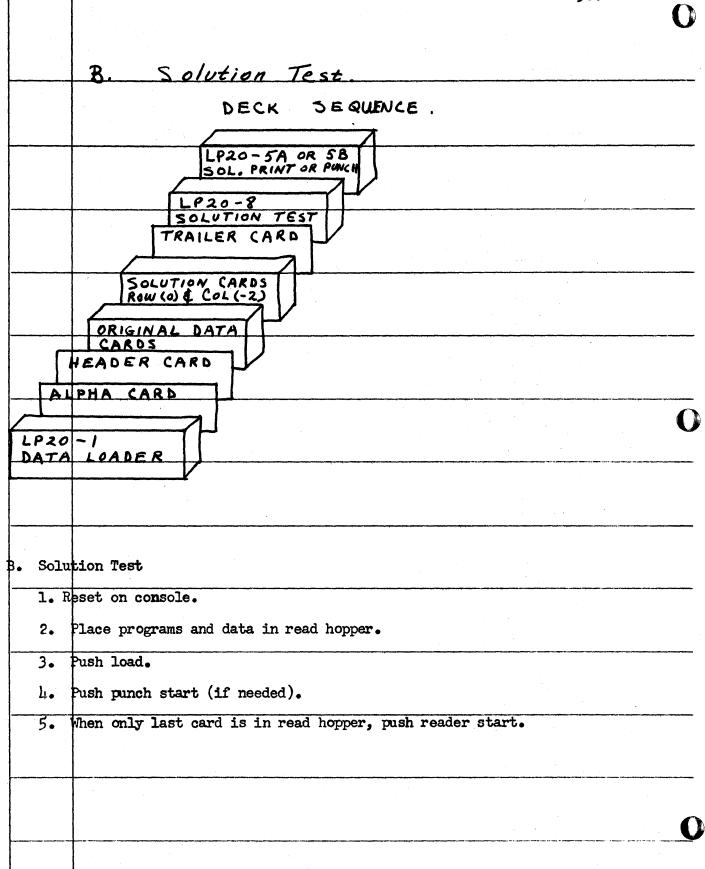
Since the first two cards of LP20-1 are a memory clear routine independent of memory size, it is not necessary to clear memory.

- 1. Push reset on console.
- 2. Set left margin and tab stops at left margin +20, left margin +35 and left margin +50.
- 3. Set sense switches.

	<u>On</u>	Off
Sense Switch 1	Print iteration	No print
Sense Switch 2	Halt after iteration	No halt
Sense Switch 3	Print final matrix	Punch final matrix

4. Load programs and data in read hopper. Use following sequence:





	C. Parametric Programming
	1. Reset on console.
	2. Set sense switch 1 on to print iteration information, off
	to bypass printing.
	3. Place program decks and data in read hopper.
	If optimum solution has just been run and is still in
	memory, use sequence A.
	SEQUENCE A
	LP20-5A OR 5B PRINT
	OR PUNCH SOLUTION
	METRIC DUAL
	P20-2
XX	HADOW PRICE XX Y
10	CARD
LP20 PARAMI UTION	etric sol-
	If optimum solution has been punched by LP20-7, Punch
	for Restart, use this sequence B.
SE	QUENCE B
	OUTPUT FROM
,	PHA CARD
LP20.	LOAD

a

Follow this sequence with sequence A.

- 4. Push load.
- 5. Push punch start (if needed).
- 6. When only last card in read hopper, use reader start.
- 7. If additional iterations are desired, reload sequence A in read hopper and push reader start.

Note: If parametric vector specified is in current basis, LP20-9 will type "ID basic" and stop at OlOll. If parametric vector specified is neither basic nor nonbasic, LP20-9 will type "I can't find it" and stop at 00988. If the parametric vector can be added to b without limit, LP20-9 will type "Solution unbounded" and stop at Ol722.

If the problem is inconsistent, LP20-10 will type "Inconsistent problem" and load the following program to print the last solution.

- D. Other variations of program sequence are possible. One may want to stop in the middle of a problem for restart later:
 - 1. Turn on sense switch 2 to halt after the completion of one iteration in the dual or simplex program:
 - 2. Remove decks from read hopper.
 - 3. Nonprocess runout.
 - 4. Reset on console.
 - 5. Load LP20-7, Matrix Punch for Restart, in read hopper.
 - 6. Push load and punch start.
 - 7. Push reader start to read last card.
 - 8. Lift blank cards from punch hopper.
 - 9. Nonprocess card punch to obtain last punched card and two blank cards.

 One may want to punch the initial table for 80 x 80 listing for a visual record of actual problem solved. Use LP20-1 to load data, follow with

LP20-6 to print or punch the initial matrix, and then follow with LP20-2 and the remaining programs of the main sequence to solve the problem.

If an inconsistent problem is detected by the dual or an unbounded solution by the simplex program, remove program decks from read hopper, nonprocess the last cards out, and load LP20-6 to print or punch the last solution.

V.A. LP20 SPSII LISTINGS.

END OF PASS 00010* 00020*	I LP20-	1, DATA	LOADER,	LINEAR	PROGRAM	MING,	NOV.	16,	1962.
00030	DORG	402			00402				
00040M	DS	3			00404	00003			
00050N	DS	4			00404				
00060F0RM	DS	2			00410				
000 7 0S	DS	5			00410				
00080MPL2	DS	3			00415	-			
00090	DS	1							
00100TEMP	DS	10			00419				
00110W	DS	,4809			00429				
00120PR0D	DS	20,99			04809				
00130CNTR	DS	2			00099				
00140CTR	DS	2			00431				
00150K	DS	2			00433				
001601	DS	3 .			004 35				
00 170J	DS.	3			00438				
00180NUMBR	DS	10			00441	-			
00190SIGN	DS	1			00451				
00200CARD	DAS	80			00452				
00210	DAC	1.@			00455				
002201NPUT	DS	21			00615	00001			
002 30	DC	1,@			00636	00021			
00240MANT	DS	8			00637	00001			
00250	DS	2			00645	00008			
00250	03	_			00647	00002			

00260EXP	DS	2	
OOZBOEAP	US		00649 00002
00270	DC	8,0	•
00280ZER0	DC	2,-99	00657 00008
302002ERU	ыс	2,-33	00659 00002
00290* 00300* REA	A A NO	WOLTE ALDUA CARD DEAD	PARAMETER CARD AND INITIALIZE.
00310*	AD AND	WRITE ALPHA CARD, READ	PARAMETER CARD AND INTITACTEL.
00320START	RCTY		00660 34 00000 00102
00330	RACD	CARD	00680 34 00000 00102
00340	UATV	CARD	00672 37 00455 00500
00340	WAII	CARD	00684 39 00455 00100
00350	RCTY		00696 34 00000 00102
00360	RCTY		
00370	RNCD	. M_2	00708 34 00000 00102
			00720 36 00402 00500
00380	SF	M-2	00732 32 00402 00000
00390	SF	M+2	
00400*			00744 32 00406 00000
00410*	CALCU	LATE S=W+10(M+3) AND ST	ORE M+2.
00420* 00430	TFM	S.W	
-		•	00756 16 00415 04809
00440	TF	TEMP, M	00768 26 00429 00404
00450	AM	TEMP, 3, 10, TEMP=M+3	3
00460	Α	S-1,TEMP	00780 11 00429 00003
00460		·	00792 21 00414 00429
00470	SM	TEMP,1,10	00804 12 00429 00001
00480	TF	MPL2,TEMP	
00490	TDM	MPL2+1,0	00816 26 00418 00429
-			00828 15 00419 00000
00500	BD	CLER, FORM	00840 43 00964 00410
00510*			•
00520* 00530*	HERE.	IF DATA IS IN FLOATING	POINT FORM - LOAD ENTIRE MATRIX.
00540L0AD	TFM	RDMAT+6,W-9	00050 46 00006 5 1.000
00550	Δ	RDMAT+5,MPL2	00852 16 00906 04800
00000	-	11010111Jjin 62	

00864 21 00905 00418

00560	TF	CHECK+11,RDMAT+6				
00570	АМ	CHECK+11,71,10			00923	
00580RDMAT	RNCD	99999	00888	11	00923	00071
005 90CHECK	BNR	MOD,99999	00900	36	99999	00500
00600	В	END	00912	45	00932	99999
00610	DORG	*-3	00924	49	0 25 96	00000
00620M0D	AM	RUMAT+6,70,10	00932			_
00630	AM	CHECK+11,70,10	00932	11	00906	000 7 0
00640	В	RDMAT	00944		00923	
00650	DORG	*=3	00956	49	00900	00000
00660*			00964			
00670* 00680*	COMPU	TE MATRIX SIZE AND SET	MATRIX	NUL	L.	
00690CLER	TF	TEMP, N	00964	26	00429	00408
00700	AM	TEMP, 3, 10			00429	
00710	М	MPL2, TEMP			00418	-
00720	TFM	CMP1+11,W-10	-	-	01101	_
00730	SF	PROD-3			00096	
00740	Α	CMP1+10,PROD		-	01100	
00750	TFM	CLEAR+23,W			01071	
00760CLEAR	TFLS	99999,ZER0	-		-	_
				49	02651 02620	
			01067 01072	000		99999 0065 9
00770	AM	CLEAR+23,10,10	01078	11	01071	00000
00780CMP1	CM	CLEAR+23,99999			01071	
00790	BNP	CLEAR			01048	
00800* 00810*	1040.1	MATRIX WHEN DATA IS IN				
00820*	TFM		EXT ET O		, , , , , , ,	
00830		CNTR,1,10	01114	16	00431	10000
00840L0ADR		CARD	01126	37	00455	00500
00850	TD	CARD+36,400	044-0		00491	

00860	TD	CARD+76,400	01150	25	00531	001.00
00870	TD	CARD+116,400		_		
00880	TD	CARD+156,400		_	00571	
00890	BD	ELOAD, CARD+1,, MIDDLE D	IGIT OF	F		BLANK.
00900AL0AD	СМ	CNTR,4,10, IS CARD FIR	NI SHED.		01322	
00910	BNE	BLOAD			00431	
00920	TFM	CLOAD+11,CARD+1,, REIN	ITIALIZ	E C		ND DLOAD.
00930	TFM	DLOAD+11,CARD-1	1 . 1		.01301	
00940	В	LOADR-12	,		01321	
009 50	DORG	*-3		49	01114	00000
00960BL0AD	АМ	CNTR,1,10	01254			
00970	AM	CLOAD+11,40,10	· -		00431	
00980	AM	DLOAD+11,40,10			01301	
00990CL0AD	вυ	DLOAD, CARD+1,7			01321	
01000	В	ALOAD	-	-	01310	
01010	DORG	*-3		4 9	01198	00000
01020DL0AD	TR	CARD-1,CARD-1,7	01310			
01030*			01310	31	00454	00454
01040* TR/ 01050*	ANSMI	T DIGITS DESIGNATING RO	N.			
01060ELOAD	TD	I-2,CARD	01322	25	00436	00455
01070	TD	I-1, CARD+2	01334	25	00437	00457
01080	TD	I,CARD+4			00438	
01090	SF	i - 2	01358	32	00436	00000
01100	SF	CARD+3			00458	
01110	CM	CARD+4,70,10, IS IT NO	NBASIC	C.	00459	_
01120	BNL	TRCOL	-		01418	-
01130	SF	I,,,SET ROW INDEX = -1			00438	-
01140* 01150* TR	ANSMI	T DIGITS DESIGNATING CO) <u>.</u>		

_							
01160* 01170TRCOL	TO	J-2,CARD+8					
01180	TD	J-1, CARD+10			00439	_	
01190	TD	J,CARD+12		-	00440		
01200	SF	J-2			00441		
01210	SF	CARD+11	· · ·	-	00439		
01220	СМ	CARD+12,70,10, IS IT B	ASIC C.		00466		
01230	BNL	ACLFL			00467	·	
01240	S F	J,,, SET COLUMN INDEX	= -1.		01514	-	
01250ACLFL	CF	CARD+3		Τ.	00441		
01260	CF	CARD+11			00458		
01270	CM	1,999,9, IS ROW = 999,	END CA	\RD	00466		
01280	BE	END			00438		
01290*				46	02608	01200	
01300* CO	MPUTE	ADDRESS OF I, J ELEMENT	•				
01320	TF	STORE+23,S	01562	26	02593	00415	
01330	TF	TEMP, J,, COLUMN INDEX.	01574	26	00429	00441	
01340	AM	TEMP, 1, 10	01586	11	00429	10000	
01350	М .	MPL2, TEMP	01598	23	00418	00429	
01360	Α .	PROD, I	01610	21	00099	00438	
01370	SF	PROD-3	01622	32	00096	00000	
01380	A	STORE+22, PROD	01634	21	02592	00099	
01390	TF	FLSET+18,STORE+23	· •		01892		
01400	CM	J,1,911	01658	14	00441	10000	
01405	BNE	ROWMI 1			01906		
	RE IF	BASIC OR NONBASIC C.	0,0,0	.,			
01430* 01440 N T	TFM	K,0,10	01682	16	00435	იტიიი	
01450	TFM	TRID+6, NUMBR-9			01724		
			01094	10	01/24	00472	

01460	TFM	TRID+11, CARD+16	01706	16	01729	Ō0471
0 1470TRI D	TD	99999,99999	01718 2	25	99999	99999
01480	AM	TRID+6,1,10	01730	11	01724	00001
01490	AM	TRID+11,2,10	01742	11	01729	00002
01500	AM	K,1,10	01754	11	00435	00001
01510	CM	K, 10, 10	01766	14	00435	0000
0 1520	BNE	TRID	01778			
01530	SF	CARD+33	01790	-	-	
01540	CM	CARD+34,70,10, IS LAST	DIGIT /	AΡ	OSITIV	'E N <u>U</u> MBER.
01550	BNL	BCLFL	01814	46	01862	01300
01560	CM	CARD+34,0,10, IS LAST [LAN	ĸ.	
01570	BE	BCLFL	01838			
01580	SF	NUMBR	01850			
01590BCLFL	CF	CARD+35	01862	_		
01600FLSET	SF	NUMBR-9	01874		-	
01610	TF	99999,NUMBR	01886	-		
01620	В	ALOAD	01898			
01630	DORG	*-3	01906	٠J.	0,1,0	00000
01640ROWMI1	BNF	TREL, I, IS IT NONBASIO	01906	1.1.	01026	UUI: 38
01650	В .	INITI	01918			
01660	DORG	*-3		49	01002	00000
	RE IF	AN A OR B ELEMENT.	01926			
01690* 01700TREL	TD	CARD+36,400	0400/	۰.	001.01	001.00
0 1710	TR	1 NPUT-20, CARD+15		_		00400
01720	SF	I NPUT-20		-		00470
01730	СМ	INPUT-19,70,10, IS FI	RST DIG	ίŤ	A NUM	
01740	BNL	CLRFLG	-			00070
			019/4	46	02086	01300

01750	СМ	INPUT-19,20,10, IS IT N		41.	00/17	00050
01760	BE	NEG	-		00617	
01770	BD	CLRFLG, INPUT-19,, IS IT	T BLANK	ζ.	02066	
01780	CF	SIGN		_	02086	•
01790SHFTSN	SF	INPUT-18			00452	
01800	TR	INPUT-20, INPUT-18			00618	
01810	В	FLOAT		-	00616	
01820	DORG	*-3	-	-	02098	00000
0.1830NEG	SF .	SIGN	02066		001.50	
01840	В	SHFTSN		-	00452	
01850	DORG	*-3	02076	4 7	02034	00000
01860CLRFLG	CF	SIGN			001.50	00000
01870FL0AT	TFM	EXP,0,10			00452	_
01880	TFM	DEC+6, INPUT-19			00649	_
01890	TFM	FLDDEF+6, INPUT-18			02152	_
01900FLDDEF	SF	99999		• -	02140	
01910DEC	CM	99999,3,10, IS IT A DEC	CIMAL	-	99999	_
01920	BE	SHFTDC			99999	
01930	AM	DEC+6,2,10	-		02214	_
01940	AM	FLDDEF+6,2,10			02 15 2	
01950	AM	EXP, 1, 10			02 140	_
01960	В	FLDDEF	•		00649	
01970	DORG	*-3	02206		02134	00000
01980SHFTDC	TF	*+47,FLDDEF+6			02261	02140
01990	TF	*+30,DEC+6			02256	
02000	SM	*+18,1,10				_
02010	TR	99999,99999	_		0 2256 99999	
02020ZRTST	BD	TRSMT, INPUT-19	-	-	02318	
			CLLUL	ر -	027.0	55517

02030	TR	INPUT-20, INPUT-18	∩227 h	21	00616	00618
02040	SM	EXP, 1, 10		-	00649	
02050	BNR	ZRTST, INPUT-19			02262	
02060	В	ALOAD	-	-	01198	-
02070	DORG	*-3	02318	٦,	01130	00000
02080TRSMT	TFM	CTR,9,10	-	16	00433	ინიიი
02090	TFM	TSTRC+11, INPUT-19			02377	
02100	TFM	STRDIG+6,MANT-7			02392	
02110	TFM	STRDIG+11, INPUT-19			02397	
02120TSTRC	BNR	STRDIG,99999			02397	
02130	В	FILL			02454	
02140	DORG	*-3		49	02454	00000
02150STRD1G	TD	99999,99999	02386	25		00000
02160	AM	TSTRC+11,2,10			99999	
02 170	AM	STRDIG+6,1,10			02 377	_
02 180	AM	STRDIG+11,2,10			02392	
02190	SM	CTR, 1, 10			02397	
02200	В	TSTRC	_		00433	
02210	DORG	*-3		49	02 366	00000
02220F1LL	TF	STRZR+6,STRDIG+6	02454	0.7	001.06	00 200
02230	SM	CTR, 1, 10			02496	
02240	BNP	SIGNST			00433	
02250STRZR	TDM	99999,0			02522	
02260	AM	STRZR+6,1,10				00000
02270	В	FILL+12			02496	
02280	DORG	*-3		49	02466	00000
02290S1GNST	BNF	*+24,SIGN	02522			
			02522	44	02546	00452

02 300	SF	MANT	02526	32 00645 00000
02310	SF	MANT-7		
02320	TE	EXP-2.MANT	02546	32 00638 00000
		·	02558	260064700645
02330STORE	TFLS	99999,EXP	02570	16 02663 0 2593
				49 02632 00000 00005 99999
				00005 00649
02 340	В	ALOAD	02600	49 01198 00000
02 350	DORG	*-3		.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
02 360END	RNCD	0	02608	
02 370	В	0	02608	36 00000 00500
	_	CTART	02620	49 00000 00000
02 380	DENU	START	00660	
LOAD SUBROU	TINES		02632	16 03066 03524
				49 02756
END OF PASS	11			

02390* 02400*	LP20-	2, SHADOW PRICE, LINEAR PROGRAMMING, NOV. 16, 1962.
02410	DORG	402 00402
02420M	DS	3 00404 00003
02430N	DS	00408 00004
02440F0RM	DS	2 00410 00002
024508	DS	5 00415 00005
02460MPL2	DS	3 00418 00003
02470	DS	1 00419 00001
02480W	DS	.4809
02490PR0D	DS	04809 00000 20,99 00099 00020
02500CNTR	DS	3
02510ZER	DC	8,0
02520ZER0	DC	00430 00008
02530S1GN	DS	00432 00002
02540MCNTR	DS	00433 00001
02550NCNTR	DS	00436 00003
02560TEMP	DS	00439 00003
02570HDNG	DAC	00449 00010 49,ITER FUNCTIONAL VAR IN @
02580HDNG2	DAC	00451 00049 12, VAR OUT@
02590*		00549 00012
02600* FI	LOAT A	ND STORE BASIC C.
02620START	TFM	STRC+23,W+20,,INITIAL ADDRESS OF FLOATED BASIC C. 00572 16 00989 04829
02630	TF	LOOP+35,S 00584 26 00643 00415
02640	TF	CNTR,M 00596 26 00422 00404
02650L00P	TOM	SIGN,0 00608 15 00433 00000
02660	AM	LOUP+35,10,10 00620 11 00643 00010
02670	TF	W-4,99999,,SECOND ADDRESS BECOMES S+10. 00632 26 04805 99999

02680	S F	W- 9	00644	22	04800	00000
02690	C	W-4, ZER-2		-	04805	
02700	BNE	FLOATC	_		00718	
02710	TFLS	W, ZERO			01707	_
				49	01676	00000 04809
02720	В	STRC	00704	000	005	Ō0432
02730	DORG	*-3	00710	49	009 66	00000
02740FL0ATC	TFM	W,03,10	00718			
02750	TFM	TSTDIG+11,W-9	00718	16	04809	00003
02760	TFM	CLRREC+11,ZER-6	00730	16	00825	0 4800
02770	TFM	CLRFLG+6,W-3	00742	16	00917	<u></u> 00424
02780	BNF	*+24,W-4	00754	16	00924	ō 4806
02790	SF	SIGN	00766	44	00 7 90	04805
02/90	CF	W-4	00778	32	00433	00000
			00790	33	04805	00000
02810	TD	W-3,400	00802	25	04806	00400
02820TSTDIG	BD	OUT1,99999	00814	43	00882	99999
02830	AM	*-1,1,10	00826	11	00825	00001
02840	SM	W, 1, 10	00838	12	04809	00001
02850	AM	CLRREC+11,1,10	00850	11	00917	00001
02860	SM	CLRFLG+6, 1, 10	00862	12	00924	00001
02870	В	TSTDIG	00874	49	00814	00000
02880	DORG	*-3	00882			
028900UT1	TF	SHIFT+11,TSTDIG+11	00882	26	00905	00825
02900SHIFT	TR	W-9,99999			04800	
02910CLRREC	TF	W-2,ZER0-6	-	-	04807	
02920CLRFLG	CF	99999			99999	
			-07.0	-		

02930	BNF	STRC-12,SIGN				
02940	SF	W-2			00954	
02950	SF	W-9	-	-	04807	
02960STRC	TFLS	99999,W		-	04800	
			00966 00978 00985 00990	49	01707 01676 005 005	00989 00000 99999 04809
02970	AM	STRC+23, 10, 10	00996	11	00989	00000
02980	SM	CNTR, 1, 10	01008	12	00422	00001
02990	BNZ	LOOP	01020	47	00608	01200
03000* 03010* FLO 03020*	DAT AI	ND STORE NONBASIC C.		•		
030300UT2	TF	STRC+23,S	01022	26	00989	001.15
03040	Α	STRC+22,MPL2				
03050	Α	STRC+22,MPL2			00988	
03060	AM	L00P+35,10,10			00988	
03070	TF	L00P+23,MPL2+1			00643	
03080	TF	STRC+41,MPL2+1			00631	7
03090	TF	CNTR,N			01007	
03100	TFM	CLRFLG+18,SETFLG			00422	
03110	T.F.M	CLRFLG+25,41,10			00936	
03120	TFM	OUT2+1,49,10			00943	
03130	TFM	OUT2+6,CALCDJ			01033	_
03140	В	LOOP			01038	
03150	DORG	*-3		49	00608	00000
03160SETFLG	SF	W-2	01172			
03170	В	STRC-12			04807	
03180	DORG	*-3	01184	49	00954	00000
			01192			

(

,	.CÜLAT	E AND STORE D(J)=Z(J)-	C(J) VA	LUE	s.	
03210* 03220CALCDJ	TF	NCNTR, N	01102	26	00439	001.08
03230	T _i F _i	ZRFNCT+23,S	-		01251	
03240	A	ZRFNCT+22,MPL2			01251	
03250ZRFNCT	TFLS	99999, ZERO			-	00410
			01228 01240 01247 01252	49 000		00000 99999 00432
03260	TF	DJL00P+28,S	01258	26	01358	00415
03270	AM	DJL00P+28,10,10	01270	11	01358	0000
03280	Α	DJLOOP+27,MPL2	01282	21	01357	00418
03290	TFM	FMULT+28,W+20	01294	16	01388	0482 9
03300	TF	FADD+23, ZRFNCT+23	01306	26	01413	01251
03310L00P2	TF	MCNTR,M	01318	26	00436	00404
03320DJL00P	TFLS	TEMP ,99999	01330 01342 01349	49		01353 00000 00449
03330FMULT	FM	TEMP ,99999	01354 01360 01372 01379 01384	16 49 000	01707 01656 005	99999 01383 00000 00449 99999
03340FADD	FA	99999,TEMP	01390 01402 01409	16 49	01707 01636 005	01413 00000 99999 00449
03350	AM	DJL00P+28,10,10	01420		01358	0000
03360	AM	FMULT+28,10,10	01432		01388	
03370	SM	MCNTR, 1, 10	01444		00436	_
03380	BNZ	DJL00P			01330	
03390	AM	DJL00P+28,20,10	01468		01358	_
03400	TFM	FMULT+28,W+20	01480		01388	_
03410	Α	FADD+22,MPL2			01412	-
03420	SM	NCNTR, 1, 10	01504		00439	_
03430	BNN	LOOP2	-		01318	

SNC 1	END	01528	47	01612	00100
RCTY					
		01540	34	00000	00102
KUIT		01552	34	00000	00102
WATY	HDNG	01564	39	00451	00100
WATY	HDNG2				
RCTY					
		01588	34	00000	00102
RCIY		01600	34	00000	00102
RNCD	0	01612	36	00000	00500
В	0				
DEND	START	01624	49	00000	00000
LNEC		00572			
INES					
		01668	49	01696	0
1					
7 F F F F F	RCTY RCTY NATY NATY RCTY RCTY RCTY RDD B B B B B B B B B B B B B B B B B B	RCTY VATY HDNG VATY HDNG2 RCTY RCTY RNCD 0 B 0 DEND START	RCTY 01540 RCTY 01552 WATY HDNG 01564 WATY HDNG2 01576 RCTY 01600 RCTY 01600 RCTY 01600 RCTY 01600 RCTY 01600 RCTY 01606 RCTY 01624 RCTY 01636	RCTY 01540 34 RCTY 01540 34 RCTY 01552 34 WATY HDNG 01564 39 RCTY 01588 34 RCTY 01600 34 RCTY 01600 34 RCTY 01612 36 DEND START 00572 INES 01636 16 01648 49 01656 16 01688 49	RCTY 01540 34 00000 RCTY 01552 34 00000 WATY HDNG 01564 39 00451 WATY HDNG2 01576 39 00549 RCTY 01600 34 00000 RCTY 01600 34 00000 RCTY 01600 34 00000 B 0 01624 49 00000 DEND START 00572 INES 01636 16 02110 01648 49 01696 01676 16 02110 01688 49 01800

	MPL2	ZERO	HDNG	*TST01G	STRC	L00P2	
	00418	004 32	00451	00814	99600	01318	•
	S	ZER	TEMP	*FLOATC	*CLRFLG	*ZRFNCT	END
χ,	00415	00430	64400	00718	00918	01228	01612
L P20	FORM	CNTR	NCNTR	LOOP	*CLRREC	*CALCDJ	FADD
щ	00410	00422	00439	80900	90600	01192	01390
TABLE	z	PROD	MCNTR	START	SHIFT	*SETFLG	FMULT
SYMBOL	00408	66000	00436	00572	46800	01172	01360
25	Σ	3	SIGN	HDNG2	0UT.	0UT2	*DJL00P
	40400	04809	00433	64500	00882	01032	01330

03540* LI	P20-3	, DUAL, LINEAR PROGRAMMING, NOV. 16, 1962.
02550*		S ON MACROS FOLLOW MACRO INSTRUCTIONS.
03570*	DORG	402
	DS	00402 3,, NUMBER OF RESTRAINING EQUATIONS.
03600N	DS	00404 00003 4,, NUMBER OF NONBASIC ACTIVITIES. 00408 00004
03610F0RM	DS	2,, FORM OF INPUT - 0 IMPLIES FLT. PT., 1 IMPLIES DECIMU 00410 00002
036208	DS	5,, REFERENCE ADDRESS FOR MATRIX, = W+10(M+3). 00415 00005
03630MPL2	DS	3,,M+2 00418 00003
03640	DS	1 00419 00001
0 3650W	DS	,4809, REFERENCE ADDRESS. 04809 00000
03660PR0D	DS	20,99, PRODUCT ADDRESS. 00099 00020
036700UTPUT	DS	10 00429 00010
03680	DC	1,@ 00430 00001
03690R	DS	10,, MAX OR MIN RATIO FOR DUAL OR SIMPLEX ALGORITHM.
03700COLADR	DS	5,, ADDRESS OF D(K).
03710ROWADR	DS	5,, ADDRESS OF B(R). 00450 00005
03720ARKADR	DS	5,, ADDRESS OF A(R,K). 00455 00005
03730CNTCOL	DS	3,, COLUMN COUNTER. 00458 00003
03740CNTROW	DS	3,, ROW COUNTER. 00461 00003
03750TEMP1	DS	10,, TEMPORARY WORK ADDRESS. 00471 00010
0 3760TEMP2	DS	10,, TEMPORARY WORK ADDRESS. 00481 00010
03770BIMIN	DS	10,, MINIMUM B(F).
03780DJMI N	DS	10,, MINIMUM D(J).
03790A1KMAX	DS	10,, DENOMINATOR OF SIMPLEX RATIO, USED TO BREAK TIES. 00511 00010
03800	DC	8,99999999
038101NF	DC	2,99,, INFINITY. 00521 00002

03820	DC	8,-99999999	
03830NEGINF	DC	2,99,, NEGATIVE INFIN	00529 00008
03840	DC	8,0	00531 00002
03850ZER0	DC	2,-99,, ZERO	00539 00008
03860	DC	8,10000000	00541 00002
038700NE	DC	2,1,, ONE.	00549 00008
03880ESSZER	DC	207	00551 00002
03890*		· · · · · · · · · · · · · · · · · · ·	00553 00002
03910* (03920* (03930* (1) C(2) S(3) M(M ENTIRE MATRIX. DMPUTE RECIPROCAL OF PET PIVOT CELL = ZERO. DVE PIVOT COLUMN TO WO ET PIVOT COLUMN = UNIT 2	RKING COLUMN.
03970TRNMTX		I 1+23.ARKADR	00555 00002
03980	TF	12+23,COLADR	00556 26 00723 00455
03990	TF	CNTROW.M	00568 26 00783 00445
04000	TF	•	00580 26 00461 00404
		FDIV1+28, ARKADR	00592 26 00698 00455
04010	TFM	MOVELP+23,W+10	00604 16 00753 04819
04020	TF	MOVELP+28, COLADR	00616 26 00758 00445
04030	TF	PIVROW+23,ARKADR	00628 26 00873 00455
		W, ONE	00640 16 02753 00663 00652 49 02722 00000 00659 00005 04809 00664 00005 00551
0405010101	FD	W, 99999	00670 16 02753 00693 00682 49 02702 00000 00689 00005 04809 00694 00005 99999
		S OF A(R,K). 99999,ZERO	
		S OF A(R,K).	00700 16 02753 00723 00712 49 02722 00000 00719 00005 99999 00724 00005 00541
04090MOVELP			00730 16 02753 00753 00742 49 02722 00000 00749 00005 99999

04100* 0411012	W+10, COLADR. TFLS 99999,ZERO	00754 00005 99999
3411012	17L3 99999,ZERU	00760 16 02753 00783 00772 49 02722 00000 00779 00005 99999 00784 00005 00541
04120* 04130	COLADR. AM MOVELP+23,10,10	
		00790 11 00753 00070
04140	AM MOVELP+28,10,10	00802 11 00758 00070
04150	AM 12+23,10,10	00814 11 00783 000T0
04160	SM CNTROW, 1, 10	• •
04170	BNN MOVELP	00826 12 00461 00001
04180PIVR0	OW TFLS 99999, ONE	00838 46 00730 01300
		00850 16 02753 00873 00862 49 02722 00000 00869 00005 99999
04190*	ADDRESS OF A(R,K).	00874 00005 00551
04200* 04210* 04220*	(5) MULTIPLY PIVOT ROW	BY RECIPROCAL OF PIVOT ELEMENT.
04230	TF PRLP+23,ROWADR	
04240	TF CNTCOL,N	00880 26 00927 00450
		00880 26 00927 00450 00892 26 00458 00408
04240 04250PRLP	TF CNTCOL,N FM 99999,W	
		00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 99999 00928 00005 04809
04250PRLP	FM 99999,W	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 99999 00928 00005 04809 00934 21 00926 00418
04250PRLP	FM 99999,W A PRLP+22,MPL2	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 99999 00928 00005 04809 00934 21 00926 00418 00946 12 00458 00001
04250PRLP 04260 04270 04280 04290* 04300*	FM 99999,W A PRLP+22,MPL2 SM CNTCOL,1,10	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 99999 00928 00005 04809 00934 21 00926 00418 00946 12 00458 00001 00958 46 00904 01300
04250PRLP 04260 04270 04280 04290*	FM 99999,W A PRLP+22,MPL2 SM CNTCOL,1,10 BNN PRLP	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 04809 00934 21 00926 00418 00946 12 00458 00001 00958 46 00904 01300 TRIX
04250PRLP 04260 04270 04280 04290* 04300* 04310*	FM 99999,W A PRLP+22,MPL2 SM CNTCOL,1,10 BNN PRLP (6) TRANSFORM ENTIRE MA	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 99999 00928 00005 04809 00934 21 00926 00418 00946 12 00458 00001 00958 46 00904 01300
04250PRLP 04260 04270 04280 04290* 04300* 04310* 04320	FM 99999,W A PRLP+22,MPL2 SM CNTCOL,1,10 BNN PRLP (6) TRANSFORM ENTIRE MA TFM ROWLP+6,W+10 TF 14+11,S	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 04809 00934 21 00926 00418 00946 12 00458 00001 00958 46 00904 01300 TRIX
04250PRLP 04260 04270 04280 04290* 04300* 04310* 04320 04330 04340	FM 99999,W A PRLP+22,MPL2 SM CNTCOL,1,10 BNN PRLP (6) TRANSFORM ENTIRE MA TFM ROWLP+6,W+10 TF 14+11,S A 14+10,MPL2	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 04809 00934 21 00926 00418 00946 12 00458 00001 00958 46 00904 01300 TRIX.
04250PRLP 04260 04270 04280 04290* 04300* 04310* 04320	FM 99999,W A PRLP+22,MPL2 SM CNTCOL,1,10 BNN PRLP (6) TRANSFORM ENTIRE MA TFM ROWLP+6,W+10 TF 14+11,S	00892 26 00458 00408 00904 16 02753 00927 00916 49 02682 00000 00923 00005 04809 00934 21 00926 00418 00946 12 00458 00001 00958 46 00904 01300 TRIX. 00970 16 01036 04819 00982 26 01077 00415

04360	TF	CNTROW, M	01010		001.64	ant at
04370ROWLP	CM	99999,99,1011, IS A(I,K), WOR	KIN	00461 G COLU	MN, EQUAL TO ZERO.
04380	BE	NXTROW	-		99999	
04390	TF	ELLP+28,ROWADR			01276	
0440014	TFM	15+23,99999,,S+10(M+2).			01130	
04410	TF	CNTCOL, N	01066		01185	
04420	TF	151+6,15+23	01078	26	00458	00408
044 30ELLP		TEMP2,99999	01090	26	01198	01185
044302221		·			02753 02722	
			01114			00000
			01126	000	005	99999
		ROW ADDRESS. INCREMENT	= 10(M-	⊦2).		
04450FMUL	+M	TEMP2,99999	01132	16	02753	01155
			01144	49	02682	00000
			01151 01156			00481 99999
04460*	W+10.	ADDRESS OF A(O,K), WORK	CING CO	DLUN	ÍN. INC	CRÉMÉNT =10.
0447015	FS	99999,TEMP2				•
			01174	49	02753 02662	00000
			01181	000	005	<u>9</u> 9999
21.1.02.1		M+2), ADDRESS OF FUNCTION	01186	000 300	005 PEMENT	00481 -10(M+2)
04480* 04490151	S+10(1	M+2), ADDRESS OF FUNCTION 99999,ESSZER,,SAME ADDR	RESS AS	S 14	5+23.	NCREMENT= 10(M+2).
04470171			01192	24	99999	00553
04500	BL	LOW	01204	Ь7	01704	01300
04510	Α	ELLP+27,MPL2	,	•	-	_
			01216	21	01129	00418
04520	A	151+5,MPL2	01228	21	01197	00418
045 30	A	15+22,MPL2	01240	21	01184	00418
04540	SM	CNTCOL, 1, 10	01252	12	00458	00001
04550	BNN	ELLP			01102	
04560NXTRO	MA W	ROWLP+6,10,10			01036	_
04570	AM	FMUL+28,10,10			01160	_
01.500			U1Z00	4 6	01100	00010
04580	AM	14+11,10,10			01077	00070

04590	SM	CNTROW, 1, 10	01212	12	00461	ററററ്റ് 1
04600	BNN	ROWLP,,,IS MATRIX TRAN	SFORMA1	101	00401 FINIS 01030	HED.
	(7) S	WITCH ID/C ELEMENTS.				
04630* 04640	TF	16+11,ROWADR	01226	26	01431	00450
04650	TF ·	SWITCH+11, COLADR			01419	
04660	SM	SWITCH+11,10,10			01419	
04670	TF	16+6,SWITCH+11			01426	
04680	S	16+10,MPL2	-,		01430	
04690	TF	17+6,16+11	_		01438	
04700SWITCH	TF	TEMP2,99999			00481	
0471016	TF	99999,99999			99999	
0472017	TF	99999, TEMP2			99999	
04730	AM	ITER+11,1,10	-		01479	_
04740	BNC 1	BBACK			01678	
047501 TER	TFM	OUTPUT,0,8		٠	00429	_
04760	WNTY	OUTPUT-3			00426	
04770	TBTY			-	00000	
04780	TF	PR1+28,S		-	01580	
04790	Α	PR1+27, MPL2,, ADDRESS	F FUNC	T I OI	AL. 01579	
04800	TF	PR2+11,16+11,,ADDRESS	OF VAR	IABI	E IN.	
04810	TF	PR3+11,16+6,, ADDRESS	OF VAR	IÄBI		
04820PR1	TFLS	OUTPUT, 99999	01552		02753	
				49	02722 005	
01.000	WMTY	OUTDUT-0	01576			99999
04830	WNIY	OUTPUT-9	01582	38	00420	00100

01.01.0	T D T M					
04840	TBTY		01594	34	00000	00108
04850PR2	TF	OUTPUT, 99999	01606	26	00429	99999
04860	WNTY.	OUTPUT-9			00420	
04870	TBTY			-		_
04880PR3	TF	OUTPUT, 99999	· -		00000	
04890	WNTY	OUTPUT-9			00429	
04900	RCTY		01654	38	00420	00100
04910BBACK	BNC2	*+24	01666	34	00000	00102
04920	Н		01678	47	01702	00200
04930	вв		01690	48	00000	00000
		* 0	01702	42	00000	00000
04940	DORG		01704			
049 50L0W	TF	TFL+23,151+6	01704	26	01739	01198
049 60 TFL	TFLS	99999,ZER0			02753	
	100			49	02722	
01.030		151.01	01740			00541
04970	В	151+24	01746	49	01216	00000
04980	DORG	*-3	01754			
04990* 05000* DUAI 05010*	L – SE	ELECT SMALLEST B(I).				
05020DUAL	TFLS	BIMIN, ZERO	0175/	16	02753	⊼1777
			01766	49	02722	00000
			01773 01778			00491 00541
05030	TF	CNTROW, M	01784	26	00461	00404
05040	TĘ	CMP1+28,S	01796	26	01890	00415
05050	Α	CMP1+27,MPL2			01889	
05060	AM	CMP1+28,10,10			01890	_
05070B1C0MP	TFLS	TEMP1,BIMIN				
•				49	02753 02722	01855 00000
			01851 01856		005 005	00471 00491

							•
05080CMP1	FS	TEMP1,99999	01862 01874 01881 01886	49 000		01885 00000 00471 99999	
05090* A	ADDRES	SS OF B(J). ROWSTP	01000	000	,00	JJJJJ	
05110NEGA	TF	MINBI+28, CMP1+28	01892	47	01958	01100	
USTIUNEGA			01904	26	01944	01890	
05120MINBI	TFLS	BIMIN, 99999	01916 01928 01935 01940	49	02753 02722 005	01939 00000 00491 99999	
0 5130	TF	ROWADR, MINBI+28,, SETUP	ROW AD	DRE	SS FOR	MATRIX	TRANSF.
05140ROWSTP	SM	CNTROW, 1, 10	-		00450	-	
05150	ВР	BICOMP-12	01958	12	00461	00001	
05160	BNF	END,BIMIN-2,,FINISHED L	JNLESS	MIN	01820 B(I) 02448	IS NEGA	TIVE.
05190*		ARGEST R= D(J)/A(R,J).	01902	44	02440	00409	
052001N1TCL 05210	TFM	COLADR,O		49 000			
-		·	02024	16	00445	00000	
05220	TF	CNTCOL,N	02036	26	00458	00408	
05230	TF	TSTARJ+6,ROWADR	02048	26	02150	<u>በበ</u> 450	
05240	TF	CS1+28,S	_	_		-	
05250	Α	CS 1+27, MPL2			02220	_	
05260RETURN	Δ	TSTARJ+5.MPL2	02072	2 1	02219	00418	
05270	TF	CMP2+6,TSTARJ+6	02084	21	02149	00418	
		•	02096	26	02174	02 150	
05280	SM	CMP2+6,2,10	02108	12	02174	00002	
05290	TF	FDIV2+28, TSTARJ+6	02120	26	02250	02150	
05300	Α	CS 1+27,MPL2			02219		
05310TSTARJ	CM	99999, 99, 1011	-		_		
			02 144	14	99999	00099	

c	2	

05 32 0	ВE	COLSTP	0215/	1.6 02.270	01200
05330CMP2	С	99999, ZERO -2		46 02378	
05340	вР	COLSTP		24 99999	
05 35 0CS 1	TFLS	TEMP2,99999		46 02 378	_
				16 02753 49 02722	00000
				00005 00005	00481 99999
05360* 05370FD1V2		S OF D(J). TEMP2,99999			
0557010112		, <u></u> 2, 0,000		16 02753 49 02702	
			02241	00005	0 0481 99999
		S OF A(R,J).	02240	00005	22222
05390	TFLS	TEMP1,R		16 02753	
			02271	49 02 722 00005	00471
05400	FS	TEMP1.TEMP2	02276	00005	00440
			02282 02294	16 02753 49 02662	
			02301	00005 00005	00471 00481
05410	вР	COLSTP		46 02378	01100
05420	TFLS	R,TEMP2		16 02753	
			02336	49 02722	00000
				00005 00005	00440
05430	TF	ARKADR, FDI V2+28	02 354	26 00455	02250
05440	TF	COLADR, CS 1+28	02 366	26 00445	02220
05450COLSTP	SM	CNTCOL, 1, 10	02 378	12 00458	00001
0 5460	BP	RETURN		46 02084	
05470	CM	COLADR,0		14 00445	_
05480	BNE	*+14		47 02428	
05490	Н	,,,ERROR HALT.	INCONSISTENT	PROBLEM. 48 00000	
05500	DORG	*-9	02428		00000
05510	втм	TRNMTX,0,10			00070
05520	В	DUAL		17 00556	
05530	DORG	*-3	02440	49 01754	. 00000
09930	Donta	,	02448		

0 5540EN D	RNCD	0	02448	36	00000	00500
05550	В	0	02460	-		
05560	DORG	2662	02662	-		
05570	DEND	DUAL	01754			
LOAD SUBROU	TINES		02662			03614
			02674 02682	16	03156	ō4158
			02694 02702 02714	16	03156	043 98
				16	03156	04734
END OF PASS	511		02/54	77	02040	

MPL2 *COLADR	TEMP 1	N.	*TRNMTX	12	ELLP	*SWI TCH	PR2	DUAL	*ROWSTP	CS 1	
00418	00471	00521	00556	09/00	01102	01408	01606	01754	01958	02192	
νĸ	*CNTROW	*A!KMAX	*ESSZER	*MOVELP	-	*NXTROW	PR I	TFL	MINBI	CMP2	
00415	00461	00511	00553	00730	01066	01276	01552	01716	01610	02168	
FORM *OUTPUT	*CNTCOL	NIWO	ONE	<u>-</u>	ROWLP	151	TER	MOT	NEGA	*TSTARJ	END
00410 00429	00458	00501	00551	00,00	01030	01192	01468	01704	0100	02 144	02448
N d	*ARKADR	N W	ZERO	FDIV1	PRLP	<u>.</u>	\ <u></u>	BRACK	CMP 1	*RETURN	*COLSTP
00408	00455	16400	00541	00670	70600	01162	01432	01678	01862	02084	02378
Σ3	*R OWA DR	TEMP2	*NEGINE	MOVFK	*PIVROW	E WILL	1	000	*RICOMP	N-X	F01 V2
00400	00420	00481	00531	00640	0000	01123	01420	01410	01822	01004	02222

LP20-4, SIMPLEX, LINEAR PROGRAMMING, NOV. 16, 1962. 05580* REMARKS ON MACROS FOLLOW MACRO INSTRUCTIONS. 05590* 05600* DORG 402 05610 00402 3,, NUMBER OF RESTRAINING EQUATIONS. 05620M 00404 00003 4,, NUMBER OF NONBASIC ACTIVITIES. 05630N 00408 00004 2,, FORM OF INPUT - 0 IMPLIES FLT. PT., 1 IMPLIES DECIMAL 05640F0RM 00410 00002 FOR MATRIX, = W+10(M+3). 5,, REFERENCE ADDRESS 0**5650**S 00415 00005 05660MPL2 DS 3,,M+2 00418 00003 05670 DS 00419 00001 ,4809, REFERENCE ADDRESS 05680W DS 04809 00000 05690PR0D DS 20,99, PRODUCT ADDRESS. 00099 00020 057000UTPUT DS 10 00429 00010 05710 DC 1,@ 00430 00001 10,, MAX OR MIN RATIO FOR DUAL OR SIMPLEX ALGORITHM. 05720R DS 00440 00010 ADDRESS OF D(K). 05730COLADR DS 00445 00005 ADDRESS OF B(R). 05740ROWADR DS 00450 00005 ADDRESS OF A(R,K). 05750ARKADR DS 00455 00005 COLUMN COUNTER. 05760CNTCOL DS 00458 00003 ROW COUNTER. 05770CNTROW DS 3,, 00461 00003 10,, TEMPORARY WORK ADDRESS. 05780TEMP1 DS 00471 00010 10,, TEMPORARY WORK ADDRESS. 05790TEMP2 DS 00481 00010 10,, MINIMUM B(1). 05800BIMIN DS 00491 00010 10,, MINIMUM D(J). O5810DJMIN DS 00501 00010 10,, DENOMINATOR OF SIMPLEX RATIO, USED TO BREAK TIES. 05820AIKMAX DS 00511 00010 05830 DC 8,99999999 00519 00008 058401NF 2,99,, INFINITY. 00521 00002 8,-99999999 05850 00529 00008

05860NEGINF	DC	2,99,, NEGATIVE INFINIT	Y. 00531	00003	
05870	DC	8,0			
0 5880 ZER0	DC	2,-99,, ZERO	00539		
05890	DC	8,10000000	00541		
059000NE	DC	2,1,, ONE.	00549	80000	
			00551	00002	
05910ESSZER	UC	2,-07	00553	00002	
05940* 05950* 05960*	(1) CI (2) SI (2) M	4 ENTIRE MATRIX. DMPUTE RECIPROCAL OF PIV ET PIVOT CELL = ZERO. DVE PIVOT COLUMN TO WORK ET PIVOT COLUMN = UNIT \ 2	CING CO	LUMN.	
06000TRNMTX	TF	I 1+23,ARKADR	00555	00002	
	TF	12+23, COLADR	00556	26 00723	00455
06010			00568	26 00783	00445
06020	TF	CNTROW,M	00580	26 00461	00404
06030	TF	FDIV1+28,ARKADR	00592	26 00698	00455
06040	TFM	MOVELP+23,W+10	00604	16 00753	0481 9
06050	TF	MOVELP+28, COLADR	00616	26 00758	00445
06060	TF	PIVROW+23,ARKADR	00628	26 00873	00455
06070MOVEK	TFLS	W, ONE	00640 00652 00659	16 02753 49 02722 00005 00005	შ0663
06080FDIV1	FÐ	W, 99999	00682 00689	16 02753 49 02702 00005 00005	00693 00000 04809 99999
06090* 0610011		SS OF A(R,K). 99999,ZERO	00712 00719	16 02753 49 02722 00005 00005	00723 00000 99999 00541

06110*	ADDRES	S OF A(R,K). 99999,99999	
06130*		COLADR.	00730 16 02753 00753 00742 49 02722 00000 00749 00005 99999 00754 00005 99999
0614012	TFLS	99999, ZERO	00760 16 02753 00783 00772 49 02722 00000 00779 00005 99999 00784 00005 00541
06150* 06160	COLADR AM	MOVELP+23,10,10	00790 11 00753 00010
06170	AM	MOVELP+28,10,10	00802 11 00758 00010
06180	AM	12+23,10,10	00814 11 00783 00070
-0.50	SM	CNTROW, 1, 10	00826 12 00461 00001
06200 06210P1VR0	BNN W TELS	MOVELP	00838 46 00730 01300
0021071400	,	99999, OIL	00850 16 02753 00873 00862 49 02722 00000 00869 00005 99999 00874 00005 00551
06220* 06230*	ADDRES	S OF A(R,K).	
06240* 06250*	(5) ML		Y RECIPROCAL OF PIVOT ELEMENT.
06260	TF	PRLP+23,ROWADR	00880 26 00927 00450
06270	TF	CNTCOL,N	00892 26 00458 00408
06280PRLP	FM	99999,W	00904 16 02753 00927 00916 49 02682 00000 00923 00005 99999 00928 00005 04809
06290	Α	PRLP+22,MPL2	00934 21 00926 00418
06300	SM	CNTCOL, 1, 10	00946 12 00458 00001
06310	BNN	PRLP	00958 46 00904 01300
06320* 06330* 06340*	(6) TF	RANSFORM ENTIRE MAT	RIX.
06350	TFM	ROWLP+6,W+10	009 7 0 16 01036 0 4819

06360	TF	14+11,5	00000 04 04077 00145
06370	Α	14+10,MPL2	00982 26 01077 00415
06380	TFM	FMUL+28,W+10	00994 21 01076 00418
0 6390	TF	CNTROW, M	01006 16 01160 0 4819
06400ROWLP	CM	΄99999,99,1011, IS A(Ι,	01018 26 00461 00404 K), WORKING COLUMN, EQUAL TO ZERO.
06410	BE	NXTROW	01030 14 99999 00055
06420	TF	ELLP+28,ROWADR	01042 46 01276 01200
0643014	TFM	15+23,99999,,S+10(M+2)	01054 26 01130 00450
06440	TF	CNTCOL,N	01066 16 01185 99999
06450	TF	•	01078 26 00458 00408
		151+6,15+23	01090 26 01198 01185
06460ELLP	11.5	TEMP2,99999	01102 16 02753 01125 01114 49 02722 <u>0</u> 0000
			01121 00005
06470* 06480FMUL	PIVOT FM	ROW ADDRESS. INCREMENT TEMP2,99999	= 10(M+2).
			01132 16 02753 01155 01144 49 02682 00000
06490*	W. 10	ADDRESS OF A(O K) HOD	01151 00005
0650015	FS	99999, TEMP2	KING COLUMN. INCREMENT =10.
			01162 16 02753 01185 011 <u>7</u> 4 49 02662 <u>0</u> 0000
			01181 00005
06510* 06520151	S+10(I		ONAL. INCREMENT =10(M+2). RESS AS 15+23. INCREMENT= 10(M+2).
06530	BL	LOW	01192 24 99999 00553
06540	Α	ELLP+27,MPL2	01204 47 01704 01300
06550	A	151+5,MPL2	01216 21 01129 00418
06560	A	15+22,MPL2	01228 21 01197 00418
06570	SM	CNTCOL.1.10	01240 21 01184 00418
06580	BNN	ELLP	01252 12 00458 00001
00000	DINN	LLLF	01264 46 01102 01300

0 65 90NXTROW	AM	ROWLP+6,10,10	01076	11 0100/	0.500
06600	AM	FMUL+28,10,10	-	11 01036	
06610	AM	14+11,10,10		11 01160	
06620	SM	CNTROW, 1, 10	-	11 01077	
06630	BNN	ROWLP,,,IS MATRIX T	RANSFORMA'	12 00461 TION FINIS 46 01030	SHED.
06640* 06650* 06660*	(7)	SWITCH ID/C ELEMENTS		10 01030	0,500
06670	TF	16+11,ROWADR	01226	06 011.21	001.50
06680	TF	SWITCH+11, COLADR		26 01431	-
06690	SM	SWITCH+11,10,10	-	26 01419	-
06700	TF	16+6,SWITCH+11	-	12 01419	
06710	S	16+10,MPL2	01372	26 01426	01419
06720	TF	17+6,16+11	01384	22 01430	00418
06730SWITCH		TEMP2,99999	01396	26 01438	01431
			01408	26 00481	99999
0674016	TF	99999,99999	01420	26 99999	99999
0675017	TF	99999, TEMP2	01432	26 99999	00481
0 6760	AM	TER+11,1,10	-	11 01479	
06770	BNC 1	BBACK		47 01678	
0 67801 TER	TFM	OUTPUT,0,8	-		
06790	WNTY	OUTPUT-3	01468	16 00429	00000
06800	TBTY	-	01480	38 00426	00100
06810	TF	PR1+28.S	01492	34 00000	00108
		•	01504	26 01580	00415
06820	Α	PR1+27,MPL2,,ADDRES	01516	21 01579	00418
06830	TF	PR2+11, I6+11, , ADDRE		1ABLE IN. 26 01617	01431
06840	TF	PR3+11,16+6,, ADDRE		ABLE OUT. 26 01653	
0 6850PR 1	TFLS	OUTPUT,99999	-		_
			01564	16 02753 49 02722	00000
				00005 00005	0042 9 99999

06860	WNTY	OUTPUT-9					
06870	TBTY		01582	38	00420	00100	
06880PR2	TF	OUTPUT, 99999	01594	34	00000	00108	
		,	01606	26	00429	99999	
06890		OUTPUT-9	01618	38	00420	00100	
06900	TBTY		01630	34	00000	00108	
06910PR3	TF	OUTPUT, 99999	01642	26	0042 9	99999	
06920	WNTY	OUTPUT-9	01654	38	00420	00100	
0 6930	RCTY		01666	34	00000	00102	
06940BBACK	BNC2	*+24		-	01702		
06950	Н				00000		
06960	ВВ				00000		
06970	DORG	*-9		42	00000	00000	
069 80L 0W	TF	TFL+23,151+6	01704			04400	
0 6 99 0TFL	TFLS	99999,ZER0	-		01739	-	
			01728	49	02753 02722	00000	
			01735 01740			99999 00541	
0 7000	В	151+24	01746	49	01216	00000	
07010	DORG	*-3	01754				
07020* 07030* SIM 07040*	PLEX A	ALGORITHM - SELECT MINI		j)=[)(K).		
07050SIMPLX	TFLS	DJMIN, ZERO	04751	• •	00.75.0	×4777	
			01766	49	02753 02722	00000	
			01773 01778	000	005 005	00501 00541	
07060	TF	CNTCOL, N	.01784	26	00458	00408	
07070	TF	DJCOMP+28,S	01796	26	01860	00415	
07080	Α	DJCOMP+27,MPL2	01808	21	01859	00418	
07090	Α	DJCOMP+27,MPL2			01859		
07100DJCOMP	TFLS	TEMP1,99999			02753		
			01072		~~177	01000	

07110*		ADDRESS OF D(J). INCREM	01851 01856	00005	00000 00471 99999
07120	FS	TEMP1,DJMIN	01862 01874 01881 01886		
07130	BNN	COLSTP	01892	46 01958	01300
07140	TF	MIN+28,DJCOMP+28	01904	26 01944	01860
0 7150MIN	TFLS	99999 , N IMLO	01916	16 02753 49 02722 00005	01939
07160	TF	COLADR, MIN+28	-	26 00445	
07170COLSTP	Α	DJCOMP+27,MPL2		21 01859	-
07180	SM	CNTCOL, 1, 10		12 00458	
07190	ВР	DJCOMP		46 01832	
07200	BNF	END, DJMI N-2	_	44 02642	
07210* 07220* SELE 07230*	ECT M	INIMUM R(I)=B(I)/A(I,K)		77 02072	00477
072401N1TR0	TFLS	R,INF	02018 02025	16 02753 49 02722 00005 00005	
07250	TFM	ROWADR, O		16 00450	
07260	TF	CNTROW, M		26 00461	
07270	TF	TSTAIK+6, COLADR		26 02146	
0 7280* 0 72 90	TF	ADDRESS OF MINIMUM D(J) TSTAIK+35,TSTAIK+6	•	26 02175	
07300	SM	TSTAIK+35,2,10		•	
07310	TF	CS1+28,S		12 02175	
07320	Α	CS1+27,MPL2		26 02212	
07330	TF	FDIV3+28,COLADR		21 02211 26 02242	

07340	В	ROWSTP+24				
07350	DORG	*-3	_	-	02436	00000
07360TSTAIK	CM	99999,99,1011, IS A(I,	02140 K) = Z	ERO		
07370	BE	ROWSTP				00099
07380	BNF	CS1,99999,, IS A(1,K)	NEGATI	VE.		01200
07390	В	ROWSTP				99999
07400	DORG	*-3			02412	00000
07410CS1	TFLS	TEMP2,99999	02184			
07420*		ADDRESS OF B(I). INCREM	02196 02203 02208	49 00 00	02722 005	02207 00000 00481 99999
07430FD1V3	FD	TEMP2,99999	-		02753	ሽንንንን
07440*		ADDRESS OF ALL KILLINGS	02226 02233 02238	49 00 00	02702 005 005	
07450	TFLS	ADDRESS OF A(I,K). INCR TEMP1,TEMP2				300/0
07460	FS	TEMP1.R	02256 02263 02268	49 00		02267 00000 00471 00481
		TEMP 1, K		49 000		02297 00000 00471 00440
0 7470	ВР	ROWSTP	02 304	46	02412	01100
07480	BE	EQUAL			02492	
0 7490TAKER	TF	MAX+28, TSTAIK+6	-		02 368	
07500MAX		A1KMAX,99999	02 340	16 49 000	02753 02722 005	0 2363
07510	TFLS	R,TEMP2	02370 02382 02389	16 49 000	02753 02722 05	02393 00000 00440
07520	TF	ROWADR, CS1+28	02 394		-	ð0481
0 7530 ROWSTP	SM	CNTROW, 1, 10			00450	
0 75 40	BNP	TSTBND			00461	
0 7550	АМ	TSTAIK+6,10,10		-	02584	
			02436	11	02 146	000 1 0

07560	AM	TSTAIK+35,10,10	กรมหล	11	02175	00010	
0 757 0	AM	CS1+28,10,10			02212		
07580	AM	FD1V3+28, 10, 10				_	
0 75 90	В	TSTAIK			02242		
0 7600	DORG	*-3		49	02140	00000	
0 7610EQUAL	TFLS	TEMP1, AIKMAX	02492			-	
			02504	49	02753 02722	00000	
			02511 02516			00471 00511	
0 7620	TF	FSUB2+28,TSTAIK+6	02522	26	02562	02146	
0 7630FSUB2	FS	TEMP1,99999	02534	16	02753	Ō2557	
			02553	000		00471	
07640	BL	TAKER	02558		-	99999	
0 765 0	В	ROWSTP	-	·	02 32 8	-	
07660	DORG	*-3	02576	49	02412	00000	
07670TSTBND	СМ	ROWADR.O	02584				
07680	BNE	*+14	02584	14	00450	00000	
07690	Н	ERROR HALT. UNBOUNG			02610 0N.	01200	
07700	DORG		02608	48	00000	00000	
	TF	ARKADR,MAX+28	02610				
07710		•	02610	26	00455	02 368	
07720	втм	TRNMTX,0,10	02622	17	00556	00000	
07730	В	SIMPLX	02634	49	01754	00000	
07740	DORG	-	02642				
0 7750END	RNCD	U	02642	36	00000	00500	

07760 B 0
07770 DORG *-3
07780 DEND SIMPLX
LOAD SUBROUTINES

02654 49 00000 00000
02662
01754
02662 16 03156 03614
02674 49 02742
02682 16 03156 04158
02694 49 02742
02702 16 03156 04398
02714 49 02742
02702 16 03156 04734
02734 49 02846

94.

SYMBOL TABLE, SIMPLEX

00404 M 04809 W 00450 *ROWADR 00481 TEMP2 00531 *NEGINF 00640 MOVEK 00850 *PIVROW 01132 FMUL 01420 I6 01642 PR3 01832 *DJCOMP 02184 CS1 02492 EQUAL	00408 N 00099 PROD 00455 *ARKADR 00491 BIMIN 00541 ZERO 00670 FDIV1 00904 PRLP 01162 I5 01432 I7 01678 BBACK 01916 MIN 02214 FDIV3 02534 FSUB2	00410 FORM 00429 *0UTPUT 00458 *CNTCOL 00501 DJMIN 00551 ONE 00700 I 1 01030 ROWLP 01192 I 51 01468 I TER 01704 LOW 01958 *COLSTP 02328 TAKER 02584 *TSTBND	00415 S 00440 R 00461 *CNTROW 00511 *AIKMAX 00553 *ESSZER 00730 *MOVELP 01066 I4 01276 *NXTROW 01552 PR1 01716 FL 02006 *INITRO 02340 MAX 02642 END	00418 MPL2 00445 *COLADR 00471 TEMP1 00521 INF 00556 *TRNMTX 00760 I2 01102 ELLP 01408 *SWITCH 01606 PR2 01754 *SIMPLX 02140 *TSTAIK 02412 *ROWSTP
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07790*	LP20-5	A, SOLUTI	ON PRINT,	LINEAR	PROGRAMM	NG,	NOV.	16,	1962.	
07800* 07810	DORG	402		00	1.00	,				
07820M	DS	3			402 					
07830N	DS	4			404 00003 408 00004					
07840F0RM	DS	2			410 00004 410 00002					
0 7850 S	DS	5								
07860MPL2	DS	3			415 00005					
07870	DS	1			418 00003					
07880COUNT	DS	3			419 00001					
07890ALPHA	DAS	80			422 00003					
07900	DAC	1,@			425 00080					
07910FUN	DAC	14,FUNCTI	ONAL = @		585 00001					
07 92 OHDNG 1	DAC	15,BASIC	SOLUTION)	587 00014					
07930HDNG2	DAC	33,1D	CJ		615 00015 LEVEL	@				
07940HDNG3	DAC	33, ID	CJ	SHAD	645 00033 OW PRICES	@				
07950START	RCTY				711 00033		00102			
07960	RCTY				776 34 00					
07970	WATY	FUN			788 34 00					
0 7 9 80	TF.	FUNCT+28	, S		800 39 00					
0 7 99 0	Α	FUNCT+27	,MPL2		812 26 00					
0 8000FUNCT	BTFS	FLTFIX,9	9999		824 21 00					
				00	1836 16 02 1848 49 02	576	00000			
					1855 00005 1860 00005		01452 99999			
08010		OUTPUT-2	0	00	866 39 02	319	00100			
08020	RCTY			00	878 34 00	000	00102			
08030	RCTY			00	890 34 00	000	00102			
0 8040		HDNG 1		00	902 39 00	615	00100			
08050	RCTY			00	914 34 00	000	00102			

00060	RCTY					
08060			00926	34	00000	00102
08070		HDNG2	00938	39	00645	00100
08080	RCTY		00950	34	00000	00102
08090	RCTY		009 62	34	00000	00102
08100	TF	COUNT,M	00974	26	00422	00404
08110	TF	BT1+11,S		_	01057	
08120	TF	BT2+28,BT1+11	•		01110	
08130	Α	BT2+27,MPL2			01109	
08140L00P1	AM	BT1+11,10,10			01057	
08150	AM	BT2+28,10,10			01110	
08160BT1	вт	FIXID,99999			02 376	
08170	WATY	OUTPUT-26			02313	
08180	TBTY				00000	_
08190BT2	BTFS	FLTF1X,99999	01082 01094 01101	16 49 000	02607 02576 005	01105 00000 01452
08200	WATY	OUTPUT-20	01106			99999
08210	RCTY				02319	
08220	SM	COUNT, 1, 10			00000	_
08230	вР	LOOP1			00422	
08240	RCTY					01100
08250		HDNG 3	01160	34	00000	00102
08260	RCTY		01172	3 9	00711	00100
08270	RCTY		01184	34	00000	00102
08280	TF	COUNT, N	01196	34	00000	00102
		,	01208	26	00422	00408
08290	TF	BT3+28,S	01220	26	01344	00415
08300	Α	BT3+27,MPL2	01232	21	01343	00418

08310	Α	BT3+27,MPL2	01244 21 01343 00418
08320	TF	L00P2+11,BT3+28	01256 26 01291 01344
08330	SM	L00P2+11,10,10	01268 12 01291 00010
08340L00P2	вт	FIXID, 99999	01280 27 02376 99999
08350	WATY	OUTPUT-26	01292 39 02313 00100
08360	TBTY		01304 34 00000 00108
08370BT3	BTFS	FLTF1X,99999	01316 16 02607 01339
			01328 49 02576 00000
			01335 00005
08380		OUTPUT-20	01346 39 02319 00100
08390	RCTY		01358 34 00000 00102
08400	Α	L00P2+10,MPL2	01370 21 01290 00418
08410	Α	BT3+27,MPL2	01382 21 01343 00418
08420	SM	COUNT, 1, 10	01394 12 00422 00001
08430	ВР	LOOP2	01406 46 01280 01100
08440	RNCD	0	01418 36 00000 00500
08450	В	0	01430 49 00000 00000
08460*		IF FOR PREBABLING DATA	FOR ALPHAMERICAL PRINTING OR
08480* PUN	CHING.	INTERNAL FORMAT IS	NEW SPS.
08490* 08500ARG	DS	10	01451 00010
08510FLTFIX	CF	ARG-9	01452 33 01442 00000
08520	TF	OUTPUT, SEVENS	
08530	CF	OUTPUT-9	01464 26 02339 02351
08540	TF	OUTPUT-10,DCMAL	01476 33 02330 00000
08550	TFM	OUTPUT-19,0,9	01488 26 02329 02361
08560	TFM	SIGN,0,10	01500 16 02320 00000
08570	BNF	JUMP, ARG-2	01512 16 02363 00000
//-		•	01524 44 01560 01449

08580	TDM	SIGN-1,2,11	01536	15	02 362	იიიი
08590	CF	ARG-2			01449	
08600JUMP	СМ	ARG, 99, 1011	_		01451	
08610	BE	WRALPH	_		01896	
08620	СМ	ARG,0,10			01451	
08630	BNP	DECIML	_		01942	
08640	СМ	ARG,4,10			01451	
08650	вн	LARGE			02022	
08660	TFM	TRNMT+11,ARG-9			01691	
08670	TFM	*+42,0UTPUT-10			01686	
08680	S	*+30,ARG			01686	
08690	S	*+18,ARG			01686	
08700TRNMT	TD	99999, 99999			99999	
08710	AM	TRNMT+11,1,10				
08720	AM	TRNMT+6,2,10			01691	
08730	СМ	TRNMT+6,OUTPUT-12	•		01686	
08740	BNH	TRNMT	•		01686	
08750	TF	WRITE+23, TRNMT+11		-	01680	
08760	TFM	EXPNT2,5,10	•		01847	
08770	S	EXPNT2,ARG			02 365	
08780	TFM	*+47,SEVENS	•		02 365	1.
08790	S	*+35,EXPNT2			01823	
08800	S	*+23,EXPNT2			01823	
08810	Α	OUTPUT-12,99999				02 365
0882 OWR I TE	TFM	*+18,0UTPUT-8				99999
08830	TD	OUTPUT-8,0	01824	16	01842	02331
08840	AM	WRITE+23,1,10	01836	25	02331	00000
08850	AM	WRITE+18,2,10	01848	11	01847	00001
00000	731.1		01860	11	01842	00002

08860	CM	WRITE+18,0UTPUT	
08870	BNH	WR I TE+12	01872 14 01842 02339
08880WRALPH	BD	SETZRO,OUTPUT-18	01884 47 01836 01100
08890	В	SETSIG	01896 43 01916 02321
08900	DORG	*-3	01908 49 02228 00000
08910SETZR0	TDM	OUTPUT,O	01916
08920	TF	OUTPUT-20,SIGN	01916 15 02339 00000
08930	ВВ		01928 26 02319 02363
08940	DORG	*-9	01940 42 00000 00000
08950DECIML	CM	ARG,4,1011	01942
08960	BNH	LARGE	01942 14 01451 00004
08970	TFM	WRITE+23,ARG-9	01954 47 02022 01100
08980	TFM	WRITE+18, OUTPUT-8	01966 16 01847 01442
08990	S	WRITE+18,ARG	01978 16 01842 02331
09000	S 50.0	WRITE+18,ARG	01990 22 01842 01451
09010	В	WR I TE+12	02002 22 01842 01451
09020	DORG	*-3	02014 49 01836 00000
09030LARGE	TF	OUTPUT-17, SEVENS-7	02022
09040	BNF	JUMP2,ARG	02022 26 02322 02344
09050	TFM	OUTPUT-20,20,10	02034 44 02082 01451
09060	CF	ARG	02046 16 02319 00020
09070	CF	OUTPUT-19	02058 33 01451 00000
09 080JUMP2	TD	OUTPUT-16,ARG	02070 33 02320 00000
09 0 90	TD	OUTPUT-18,ARG-1	02082 25 02323 01451
09100	CF	OUTPUT-18	02094 25 02321 01450
09110	TF	OUTPUT-12,SIGN	02106 33 02321 00000
09120	CF	OUTPUT-13	02118 26 02327 02363
09130	TFM	WR+11,ARG-9	02130 33 02326 00000
		• •	02142 16 02177 01442

09140	TFM	WR+6,0UTPUT-8	00151-16-00170-70001
09 150W R	TD	99999,99999	02154 16 02172 02331
09160	AM	WR+11,1,10	02166 25 99999 99999
09170	AM	WR+6,2,10	02178 11 02177 00001
09180	СМ	WR+6,0UTPUT	02190 11 02172 00002
09190	BNH	WR	02202 14 02172 02339
09200	вв		02214 47 02166 01100
09210	DORG	*-9	02226 42 00000 00000
09 220 SETS1G	TFM	SETS+11,0UTPUT-16	02228
09230SETS	BD	SET, OUTPUT-16	02228 16 02251 02323
09240	AM	SETS+11,2,10	02240 43 02272 02323
09250	В	SETS	02252 11 02251 00002
09 260	DORG	*-3	02264 49 02240 00000
09 270 SET	TF	*+30,SETS+11	02272
09280	SM	*+18,2,10	02272 26 02302 02251
09290	TF	99999,SIGN	02284 12 02302 00002
09300	вв	,	02296 26 99999 02363
09310	DORG	*-9	02308 42 00000 00000
09320	DAS	14	02310
093300UTPUT		2	02311 00014
09340	DAC	1,@	02339 00002
09 35 0SEVENS		10,7070707070	02 34 1 00001
09360DCMAL	DC	10,0000000003	02351 00010
			02361 00010
09370SIGN	DS	2	02363 00002
09380EXPNT2	υS	2	02365 00002
	ROUTIN	NE FOR PREPARING ID/CJ	ELEMENTS FOR PRINTING.
09 410* 09 42 0	DS	10	02275 00010
			02375 00010

09430FIXID	TR	OUTPUT-27,	I D-1	00.27/	- 1	00010	00.51.6
09440	TD	OUTPUT-26,	FIXID-10		-	02312	-
09450	TD	OUTPUT-24,	FIXID-9			02313	_
09460	TĐ	OUTPUT-22,	FIXID-8			02 3 1 5	
09470	T D	OUTPUT-20,	FIXID-7			02317	
09 480	TD	OUTPUT-12,	FIXID-6	02424	25	02319	02369
09 490	TD	OUTPUT-10,	FIXID-5	02436	25	02327	02370
09500	TD	OUTPUT-8.F		02448	25	0232 9	02371
09510	TD	OUTPUT-4.F		02460	25	02331	02372
09520	TD	OUTPUT-2,F		02472	25	02335	02373
				02484	25	02337	02 374
09530	TD	OUTPUT,FIX		02496	25	02339	02375
09540	BNF	*+36,FIXID		02508	44	02544	02 375
09550	TFM	OUTPUT-14,	20,10	02520	16	02325	000 2 0
09 560	CF	OUTPUT-15		02532	33	02324	00000
09 570	BB				-	00000	
09580	DORG	*-9		02546	-12	00000	00000
09 5 901D	DAC	15,0000	000.000@	02547	000	115	
09600	DEND	START			000	715	
LOAD SUBROUTINES			00776			3-1-0	
				02576 02588		03010 02700	03468 0
END OF PASSI	1 1						

SYMBOL TABLE, LP 20-5A

MP L2	HDNG2	BT1	*FLTF1X	*SETZR0	*SETS1G	DCMAL	
004 18	00645	01046	01452	01916	02228	02361	
, vs	HDNG1	L00P1	ARG	*WRALPH	¥	*SEVENS	01
00415	00615	01022	01451	01896	02166	02351	02547
FORM	FICN	FUNCT	BT3	WRI TE	JUMP2	*0UTPUT	FIXID
00410	00587	00836	01316	01824	02082	02339	02376
z	ALPHA	START	L00P2	TRNMT	LARGE	SET	*EXPNT2
00408	00425	92200	01280	01680	02022	02272	02365
Σ	COUNT	HDNG3	812	JUMP	*DECIML	SETS	SIGN
40400	00422	00711	01082	01560	01942	02240	02363

	LP20-5	B, SOLUTION PUNCH,	LINEAR PROGRAMMING, NOV. 16, 1962.
09 620* 09 630	DORG	402	00402
09 640M	DS	3	
09 650N	DS	4	00404 00003
09660F0RM	DS	2	00408 00004
09 670 S	DS	5	00410 00002
09 680MPL2	11		00415 00005
	DS	3 ,,	00418 00003
09690		Acres 1	00419 00001
09700COUNT	DS	3. 1 3. 19 3. 1	00422 00003
09 710 ALPHA	DAS	80	00425 00080
09 720	DAC	1,@	00585 00001
09 730FUN	DAC	14, FUNCTIONAL = @	00587 00014
09740HDNG1	DAC	15, BASIC SOLUTION@	* * ·
09 750HDNG2	DAC	33,1D CJ	LEVEL @ 00645 00033
09 760HDNG3	DAC	33,1D CJ	SHADOW PRICES @
09770BLANKS	DAS	80	00711 00033
09 780	DAC	1,@	00777 00080
09 7 901TER	DC	3,001	00937 00001
09800START		BLANKS-1	00940 00003
09810		BLANKS+79	00942 36 00776 00500
- D			00954 36 00856 00500
09820		BLANKS	00966 39 00777 00400
09830	TR	ALPHA-1,BLANKS-1	00978 31 00424 00776
09 840	TF	ALPHA+24, FUN+24	00990 26 00449 00611
09850	TF	FUNCT+28,S	01002 26 01054 00415
09 860	Α	FUNCT+27,MPL2	01014 21 01053 00418
09 870FUNCT	BTFS	FLTF1X,99999	01026 16 03091 01049
			01038 49 03060 00000 01045 00005

			01050	00005		99999
09 880	TF	ALPHA+46,OUTPUT	01056	26 00	471	02721
09890	ВТ	FIXIT, ITER	01068	27 02	974	00940
09900	AM	ITER, 1, 10	01080	11 00	940	00001
09910	WACD	ALPHA	01092	39 00	425	00400
09920	TR	ALPHA-1, BLANKS-1	01104			
09930	WACD	BLANKS	01116	•		
09940	TF	ALPHA+26,HDNG1+26	01128			
09950	ВТ	FIXIT, ITER	01140			
099 60	AM	ITER,1,10	01152			_
099 7 0	WACD	ALPHA	01164		_	
09980	TR	ALPHA-1,BLANKS-1	01176			
09990	WACD	BLANKS	01188			
10000	TF	ALPHA+62,HDNG2+62		26 00		
10010	вт	FIXIT, ITER				00940
10020	AM	ITER,1,10		11 00		_
10030	WACD	ALPHA			-	
10040	TR	ALPHA-1,BLANKS-1		- '		00400
10050	WACD	BLANKS		-		00776
10060	TF	COUNT,M		39 00		
10070	TF	BT1+11,S				00404
10080	ŤF	BT2+28,BT1+11				00415
10090	Α	BT2+27,MPL2				01355
10100L00P1	АМ	BT1+11,10,10				00418
10110	AM	BT2+28,10,10	_			00010
10120BT1	вт	FIXID,99999				00010
10130	TF	ALPHA+26,OUTPUT	01344	27 0:	2758	99999
10140BT2		FLTFIX,99999	01356	26 0	0451	02721
10170012	<i>D</i> 11 3	· · • · · · · · · · · · · · · · · · · ·	01368			01391 00000
			5.,00			

10150		ALDUA EC QUEDUT	01387 01392		005 005	0 1834 99999
10150	TF	ALPHA+56,OUTPUT	01398	26	00481	02721
10160	ВТ	FIXIT, ITER	01410	27	02974	00940
10170	AM	ITER, 1, 10	01422	11	00940	10000
10180		ALPHA	01434	3 9	00425	00400
10190	TR	ALPHA-1,BLANKS-1	01446	31	00424	00776
10200	SM	COUNT, 1, 10	01458	12	00422	00001
10210	ВР	LOOP 1	01470	46	01320	01100
10220	WACD	BLANKS	01482	3 9	00777	00400
10230	TF	ALPHA+62, HDNG 3+62	01494	26	00487	00773
10240	вт	FIXIT, ITER	01506	27	02974	00940
10250	AM	ITER, 1, 10	01518	11	00940	00001
10260	WACD	ALPHA	01530	3 9	00425	00400
10270	TR	ALPHA-1, BLANKS-1			00424	
10280	WACD	BLANKS	-	-	00777	
10290	TF	COUNT, N		-	00422	
10300	TF	BT3+28,S	7		01690	
10310	Α .	BT3+27,MPL2			01689	
10320	Α	BT3+27, MPL2	7.7		01689	
10330	TF .	L00P2+11,BT3+28		-	01649	
10340	SM	L00P2+11,10,10			01649	_
10350L00P2	ВТ	FIXID,99999			02758	
10360	TF	ALPHA+26,0UTPUT			00451	
10370BT3	BTFS	FLTF1X,99999	01662		03091	Ō1685
					03060	00000
10380	TF ·	ALPHA+56.OUTPUT	01686			99999
10390	вт	FIXIT, ITER	01692	26	00481	02721
10,00	٠.		01704	27	02974	00940

10400	AM	ITER,1,10	01716	11	00940	00001	
10410	WACD	ALPHA			00425		
10420.	TR	ALPHA-1, BLANKS-1	•		00424		
10430	Α	L00P2+10,MPL2		-	01648		
10440	Α	BT3+27,MPL2	.,,		01689		
10450	SM	COUNT, 1, 10	• •		00422	_	
10460	вР	LOOP2			01638		
10470	RNCD	0	-		00000		
10480	В	0		Ī.			
10490*		NE FOR PREPARING DATA		-	00000		
10510* PUN	CHING				RICAL	PRINTING U	ĸ
10520* 10530ARG	DS	10	04000	0.04			
10540FLTF1X	CF	ARG-9	01833				
10550	TF	OUTPUT.SEVENS	01834	33	01824	00000	
10560	CF	OUTPUT-9	01846	26	02721	02733	
10570	TF	OUTPUT-10,DCMAL	01858	33	02712	00000	
10580	TFM	OUTPUT-19,0,9	01870	26	02711	02743	
10590	TFM	SIGN, 0, 10	01882	16	02702	00000	
10600	BNF	JUMP.ARG-2	01894	16	02745	00000	
10610	TDM	SIGN-1,2,11	01906	44	01942	01831	
			01918	15	02744	00002	
10620	CF	ARG-2	01930	33	01831	00000	
10630JUMP	CM	ARG, 99, 1011	01942	14	01833	00099	
10640	BE	WRALPH	01954	46	02278	01200	
10650	CM	ARG,0,10	01966	14	01833	00000	
10660	BNP	DECIML	•		02 324		
10670	CM	ARG,4,10	- 1.	•	01833		
10680	вн	LARGE					
			02002	46	02404	01100	

10690	TFM	TRNMT+11,ARG-9	02011	16	02072	⊼10al.
10700	TFM	*+42,0UTPUT-10				Ō1824
10710	S	*+30,ARG				Ō2711
10720	S	*+18,ARG	100			01833
10730TRNMT	TD	99999,99999	30.5			01833
10740	AM	TRNMT+11,1,10	400			99999
10750	AM	TRNMT+6,2,10	-		02073	
10760	CM	TRNMT+6, OUTPUT-12	02086	,11	02068	00002
10770	BNH	TRNMT	02098	14	02068	შ27 09
10780	TF	WRITE+23,TRNMT+11	02110	47	02062	01100
10790	TFM	EXPNT2,5,10	02122	26	0222 9	02073
10800		EXPNT2,ARG	02134	:16	02747	00005
10810	TFM		02146	22	02747	01833
7.5 % 5			02158	16	02205	02733
10820		*+35,EXPNT2	02170	22	02205	02747
10830	S		02182	22	02205	02747
10840		OUTPUT-12,99999	02194	21	02709	99999
10850WR1TE	TFM	*+18,0UTPUT-8	02206	16	02224	Ō2713
10860	TD	OUTPUT-8,0	02218	25	02713	00000
10870	AM	WRITE+23,1,10	02230	11	02229	00001
10880	AM	WRITE+18,2,10			02224	_
10890	CM	WRITE+18,0UTPUT			02224	
10900	BNH	WR i TE+12			02218	-
10910WRALPH	BD	SETZRO, OUTPUT-18		•	02298	
10920	В	SETSIG			02610	
10930	DORG	*-3	_	77	02010	00000
10940SETZRO	TDM	OUTPUT, O	02298		00704	00000
10950	TF	OUTPUT-20,SIGN		-	02721	
10960	вв				02701	
			02 322	42	00000	00000

10)/0	50.10	,	00 201.				
10980DECIML	СМ	ARG,4,1011	02324				
10990	вин	LARGE			01833		
11000	TFM	WRITE+23,ARG-9			02404		
11010	TFM	WRITE+18,0UTPUT-8			02229		
11020	S	WRITE+18,ARG			02224		
11030	S	WRITE+18,ARG			02224		
11040	В	WRITE+12			02224		
11050	DORG	*-3		49	02218	00000	
11060LARGE	TF	OUTPUT-17, SEVENS-7	02404				
11070	BNF	JUMP2,ARG	100		02704	- A 24-14	
11080	TFM	OUTPUT-20,20,10	37. 3		02464		
11090	CF	ARG			02701		
11100	CF	OUTPU T-1 9			01833		
11110JUMP2	TD	OUTPUT-16,ARG			02702		
11120	TD	OUTPUT-18,ARG-1			02705		
11130	CF	OUTPUT-18	-		02703	-	
11140	TF	OUTPUT-12,SIGN			02703		
11150	CF	OUTPUT-13			02709		
11160	TFM	WR+11,ARG-9			02708		
11170	TFM	WR+6, OUTPUT-8			02559		
11180WR	TD	99999, 99999			02554		
11190	AM	WR+11,1,10			99999		
11200	AM	WR+6,2,10			02559		
11210	СМ	WR+6,0UTPUT			02554		
11220	вин	WR			02554		
11230	ВВ			-	02548		
			02608	42	00000	00000	

DORG *-9

11240	DORG	*-9	
11250SETSIG	TFM	SETS+11,0UTPUT-16	02610
11260SETS	BD	SET, OUTPUT-16	02610 16 02633 02705
11270	AM	SETS+11,2,10	02622 43 02654 02705
11280	В	SETS	02634 11 02633 00002
11290	DORG	*-3	02646 49 02622 00000
11300SET	TF	*+30,SETS+11	02654
11310	SM	*+18,2,10	02654 26 02684 02633
11320	TF	99999,SIGN	02666 12 02684 00002
11330	ВВ	Assertion of the second of the	02678 26 99999 02745
11340	DORG	*-9	02690 42 00000 00000
11350	DAS	14	02692
113600UTPUT	DS	2	02693 00014
11370	DAC	1,@	02721 00002
11380SEVENS	DC	10,7070707070	02723 00001
11390DCMAL	DC	10,000000003	02733 00010
11400SIGN		2	02743 00010
11410EXPNT2	4 52		02745 00002
11420*		-	02747 00002
11430* SUBR 11440*		E FOR PREPARING ID/CJ	ELEMENTS FOR PRINTING.
11450		10	02757 00010
11460FIXID		OUTPUT-27,1D-1	02758 31 02694 02940
		FIXID-10	02770 33 02748 00000
11480		OUTPUT-26,FIXID-10	02782 25 02695 02748
		OUTPUT-24,FIXID-9	02794 25 02697 02749
		OUTPUT-22,F1XID-8	02806 25 02699 02750
		OUTPUT-20,FIXID-7	02818 25 02701 02751
11520	TĐ (OUTPUT-12,FIXID-6	02830 25 02709 02752

11530	TD	OUTPUT-10,FIXID-5	02842 25 02711 02753
11540	TD	OUTPUT-8,FIXID-4	
11550	TD	OUTPUT-4,FIXID-3	02854 25 02713 02754
11560	TD	OUTPUT-2,FIXID-2	02866 25 02717 02755
11570	TD	OUTPUT, FIXID-1	02878 25 02719 02756
11580	BNF	*+36,FIXID-1	02890 25 02721 02757
11590	TFM	OUTPUT-14,20,10	02902 44 02938 02757
11600	CF	OUTPUT-15	02914 16 02707 00020
11610	ВВ		02926 33 02706 00000
11620	DORG	*-9	02938 42 00000 00000
11630ID	DAC	15,0000 000.000@	02940
	ROUTH	NE TO FLOAT SEQUENCE NU	02941 00015 MBER.
11660* 11670	DS	3	
11680F1X1T	TF	OUT, SEVNS	02972 00003
11690	CF	FIXIT-3	02974 26 03053 03059
11700	TD	OUT,FIXIT-1	02986 33 02971 00000
11710	TD	OUT-2,FIXIT-2	02998 25 03053 02973
11720	TĐ	OUT-4,FIXIT-3	03010 25 03051 02972
11730	TF	ALPHA+158,0UT	03022 25 03049 02971
11740	вв		03034 26 00583 03053
11750	DORG	*-9	03046 42 00000 00000
11760	DAS	2	03048
117700UT	DS	2	03049 00002
11780SEVNS	DC	6,707070	03053 00002
11790	DEND	START	03059 00006
LOAD SUBROUT	TINES		00942
	··		03060 16 03494 03952 03072 49 03184 0

112.

MPL2 HDNG2 FUNCT BT3 WRITE *OUTPUT FIXID	05\28 07\20 07\20 07\20 07\20 07\20 07\20 07\20 07\20 07\20 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30 07\30	S HDNG 1 2TAR 1 LOOP2 LARGE SET SET SEVN 2 SEVN 3	65080 24270 45970 40470 79070 88910 74600 74600 51900 51400	FORM FORM FDE SIGN FORM FORM FORM FORM FORM FORM FORM FORM	\$5080 \$420 7750 74610 89810 04600 28500 01400	N ALPHA *SETSIG BT1 *FLTFIX *SETSIG *SETSIG *SETSIG *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *PLTFIX *P	86220	м соиит ноис 3 LOOP 1 ARG	025941 02733 02278 02278 00720 00407 00407 00407
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PUNCH, LINEAR PROGRAMMING,	00402		00039 00020			004.15							000 35 00003	00438 00003	000441 00003	90000 9 11/ 00	000456 00010	000659 00080	00019 00001	00621 00080	00781 00001 CARDS TO CLEAR B	00782 36 00620 00500	00200 00200 96 %6200	00806 47 00862 00300
OR PU) BLANK			
LP20-6, MATRIX PRINT NOV. 16, 1962. DORG 402	,4809	20,99														. =	S- 6		. c		BLANKS-1,,,READ	BLANKS+79		CAR
.P20-6, NOV. DORG 4	, sa	05 2	DS 3	ty 50	05 2	5 50	05 3	1 50	SO 3	5 50	DS 5	DS 3	05 3	. SQ) DS 5		v			-	_	RNCD B		
11800* L 11810* 11820* 11830	11840W	11850PR0D	11860M	11870N	11880F0RM	118905	11900MPL2	11910	11920NPL2	119301 NADD	11940R0WADD	11950NPR!NT	11960C0UNT1	11970C0UNT2	11980MP2X5	11990TEMP	12000CARD	12010	OLOZI	12020	L N	12050		09071

12070	RCTY		00818	34	00000	00102
12080	RCTY		00830	34	00000	00102
12090	RCTY		00842	34	00000	00102
12100	В	GO		-	00886	
12110	DORG	*-3	00862	.,		
12120CAR	WACD	BLANKS		20	00621	antian
12130	WACD	BLANKS			00621	
12140G0	SF	M-2	•	-		
12150	SF	M+2		-	00402	
12160	TF.	MPL2,M		-	00406	
12170	AM	MPL2,2,10	-		00418	
12 180	TF	NPL2,N			00418	
12190	АМ	NPL2,2,10	00934	26	00422	00408
12200	TFM	INADD.W	00946	11	00422	00002
12210	Α	INADD-1,MPL2	00958	16	00427	0 4809
12220	TFM	NPRINT.5.9	00970	21	00426	00418
			00982	16	00435	00005
12230	MM	MPL2,50,10	00994	13	00418	00050
12240	SF	PROD-4	01006	32	00095	00000
12250	TF	MP2X5,PROD	01018	26	00446	00099
12260L00P3	TF	ROWADD, I NADD	01030	26	00432	00427
12270	TF	COUNT2,MPL2	01042	26	00441	00418
	SSIFY	ELEMENT, FLOAT, AND	TRANSMIT	T 0	CARD I	MAGE.
12300* 12310L00P2	TR	CARD-1,BLANKS-1	0.051		001.50	00/00
12 32 0	TF	COUNT1,NPRINT			00458	
12330	TFM	TRAN+6, CARD+26			00438	
12 34 0	TF	TFLOAT+28.ROWADD	01078	16	01284	ō0485∙
12 350	AM	ITER+11,1,10	01090	26	01190	00432
12950	, 31 1		01102	11	01125	00001

	12 3601 TER	втм	FIXIT,0,9	01114 17 02768 00000
	12370L00P1	TF	CLASS+11,TFLOAT+28	01126 26 01161 01190
	12380	SM	CLASS+11,1,10	
	12390CLASS	BNF	IDEN1,99999,,FIELD ADDR	01138 12 01161 00001 ESS-1. IS FIELD A FLT. PT. NO.
	12400TFLOAT	TFLS	TEMP, 99999	01150 44 01254 99999
		•		01162 16 02905 01185 01174 49 02854 00000
				01181 00005 0 0456 01186 00005 9 9999
	12410	CM .	TEMP,99,1011, IS FIELD	A FLOATING POINT ZERO. 01192 14 00456 00099
	12420	BE	SKIP	01204 46 01290 01200
	12430BFLOAT	BTFS	FLTFIX, TEMP	01216 16 02905 01239
				01228 49 02874 00000 01235 00005 01628
	12440	В	TRAN	01240 00005 00456
	12450	DORG		01246 49 01278 00000
				01254
	124601 DEN1	TF	IDEN2+11,TFLOAT+28	01254 26 01277 01190
	124701DEN2	ВТ	FIXID, 99999	01266 27 02552 99999
	12480TRAN	TF	99999, OUTPUT	01278 26 99999 02515
	12490SKIP	Α	TFLOAT+27,MPL2	01290 21 01189 00418
	12500	AM	TRAN+6,30,10	01302 11 01284 00030
	12510	SM	COUNT1,1,10	01314 12 00438 00001
	12520	ВР	L00P1	01326 46 01126 01100
	12530*	IT OP	PUNCH ONE LINE OF FIVE	
	12550*			
	12560	BNC 3		01338 47 01382 00300
•	12570	WATY	CARU	01350 39 00459 00100
	12580	RCTY		01362 34 00000 00102
	12590	B	*+20	01374 49 01394 00000
	12600	DORG	*-3	01382
	12610	WACD	CARD	01382 39 00459 00400
	12620	AM	ROWADD, 10, 10	01394 11 00432 00070
				01771 11 00772 00010

			110.
12630	SM	COUNT2,1,10	01406 12 00441 00001
12640	ВР	L00P2	
12650	BNC 3	*+44	01418 46 01054 01100
12660	RCTY		01430 47 01474 00300
12670	RCTY		01442 34 00000 00102
12680	В	STOP-	01454 34 00000 00102
12690	DORG	*-3	01466 49 01498 00000
12700	WACD	BLANKS	01474
12710	WACD	BLANKS	01474 39 00621 00400
12720ST0P	Α	INADD,MP2X5	01486 39 00621 00400
12730	S	NPL2, NPR NT	01498 21 00427 00446
12740	С	NPL2, NPRINT	01510 22 00422 00435
12750	BNP	END	01522 24 00422 00435
12760	В	LOOP3	01534 47 01554 01100
12770	DORG	*-3	01546 49 01030 00000
12780END	TF	NPRINT, NPL2	01554
12790	TFM	STOP+1,49,10	01554 26 00435 00422
12800	TFM	STOP+6, FINISH	01566 16 01499 00049
12810	В	LOOP3	01578 16 01504 01598
12820	DORG	*-3	01590 49 01030 00000
12830FINISH			01598
12840	В	0	01598 36 00000 00500
12850	DORG	*-3	01610 49 00000 00000
12860*		•	01618
12870* SUBR	OUTING.		FOR ALPHAMERICAL PRINTING OR NEW SPS.
12900ARG	DS	10	01627 00010
12910FLTFIX	CF	ARG-9	01628 33 01618 00000

12920	TF	OUTPUT, SEVENS	በ16μበ	26	02515	02527
12930	CF	OUTPUT-9			02506	
12940	TF	OUTPUT-10,DCMAL		-	02505	
12950	TFM	OUTPUT-19,0,9			02496	
12960	TFM	SIGN,0,10			02539	
12970	BNF	JUMP,ARG-2			01736	
12980	TDM	SIGN-1,2,11			02538	_
12990	CF	ARG-2	•	_		
13000JUMP	СМ	ARG,99,1011			01625	
13010	BE	WRALPH			01627	
13020	СМ	ARG,0,10			02072	
13030	BNP	DECIML			01627	
13040	СМ	ARG,4,10	• •		02118	
13050	вн	LARGE			01627	
13060	TFM	TRNMT+11,ARG-9			02198	
13070	TFM	*+42,0UTPUT-10				Ō1618
13080	s	*+30.ARG	01820	16	01862	02505
13090	s	*+18,ARG	01832	22	01862	01627
13100TRNMT	TD	99999,99999	01844	22	01862	01627
13110	AM	TRNMT+11,1,10	01856	25	99999	99999
13120	AM	TRNMT+6,2,10	0 186 8	11	01867	10000
13130	CM	TRNMT+6,OUTPUT-12	01880	11	01862	00002
13140	BNH	TRNMT	01892	14	01862	შ2503
13150	TF	WRITE+23, TRNMT+11	01904	47	01856	01100
13160	TFM	EXPNT2,5,10	01916	26	02023	01867
			01928	16	02541	00005
13170	\$	EXPNT2,ARG	01940	22	02541	01627
13180	TFM	*+47,SEVENS	01952	16	01999	02527
13190	S	*+35,EXPNT2	01964	22	01999	02541

13200	S	*+23,EXPNT2	01976	22	01999	02541
1 32 10	Α	OUTPUT-12,99999			02503	
13220WRITE	TFM	*+18,0UTPUT-8			02018	_
13230	TD	OUTPUT-8,0				
1 3240	AM	WRITE+23,1,10		-	02507	
13250	AM	WRITE+18,2,10			02023	_
13260	СМ	WRITE+18,0UTPUT			02018	
13270	BNH	WR I TE+12			02018	
13280WRALPH	BD	SETZRO,OUTPUT-18		-	02012	
13290	В	SETSIG	•	-	02092	
13300	DORG	*-3	02084	49	02404	00000
13310SETZR0	TDM	OUTPUT, O	02092			
13320	TF	OUTPUT-20,SIGN	02092	15	02515	00000
13330	ВВ	22,	02 104	26	02495	02539
13340	DORG	*=0	02116	42	00000	00000
13350DECIML		ARG,4,1011	02118			
			02118	14	01627	00004
13360	BNH	LARGE	02130	47	02 198	01100
13370	TFM	WRITE+23,ARG-9	02142	16	02023	ō1618
13380	TFM	WRITE+18,0UTPUT-8	02154	16	02018	შ2507
13390	S	WRITE+18,ARG	02 166	22	02018	01627
1 3400	S	WRITE+18,ARG	02 178	22	02018	01627
13410	В	WR I TE+12	02190	49	02012	00000
13420	DORG	*-3	02198			
13430LARGE	TF	OUTPUT-17, SEVENS-7	-	26	02498	02520
1 3440	BNF	JUMP2,ARG	-		02258	
13450	TFM	OUTPUT-20,20,10			_	•
13460	CF	ARG			02495	
			U2234	33	01627	00000

13470	CF	OUTPUT-19	0001.6	22	021.06	00000
13480JUMP2	TD	OUTPUT-16,ARG			02496 02499	
13490	TD	OUTPUT-18,ARG-1	-			
13500	CF	OUTPUT-18			02497 02497	
13510	TF	OUTPUT-12,SIGN			02503	
13520	CF	OUTPUT-13				
13530	TFM	WR+11,ARG-9	_		02502	
13540	TFM	WR+6,0UTPUT-8			02353	
13550WR	TD	99999,99999			02 348	
13560	AM	WR+11,1,10			99999	
13570	AM	WR+6,2,10			02353	•
13580	СМ	WR+6,OUTPUT	_		02 348	
13590	вин	WR			02 348	
13600	ВВ				02 342	
13610	DORG	*-9			00000	00000
13620SETS1G	TFM	SETS+11,0UTPUT-16	0 2404			
13630SETS	BD	SET, OUTPUT-16			02427	
13640	AM	SETS+11,2,10		-	02448	
13650		* *			00107	ለሰለሽን
	В	SETS	02428	11	02427	00002
13660					02427	
13660 13670SET	B DORG TF		02440 02448	4 9	02416	00000
13670SET	DORG TF	*-3 *+30,SETS+11	02440 02448	4 9		00000
13670SET 13680	DORG TF SM	*-3 *+30,SETS+11 *+18,2,10	02440 02448 02448	49 26	02416	00000
13670SET 13680 13690	DORG TF	*-3 *+30,SETS+11	02440 02448 02448 02460	49 26 12	02416 02478	00000 02427 000 0 2
13670SET 13680 13690 13700	DORG TF SM TF BB	*-3 *+30,SETS+11 *+18,2,10 99999,SIGN	02440 02448 02448 02460 02472	49 26 12 26	02416 02478 02478	00000 02427 00002 02539
13670SET 13680 13690 13700	DORG TF SM TF BB DORG	*-3 *+30,SETS+11 *+18,2,10 99999,SIGN *-9	02440 02448 02448 02460 02472	49 26 12 26 42	02416 02478 02478 99999	00000 02427 00002 02539
13670SET 13680 13690 13700 13710 13720	DORG TF SM TF BB DORG DAS	*-3 *+30,SETS+11 *+18,2,10 99999,SIGN *-9 14	02440 02448 02448 02460 02472 02484	49 26 12 26 42	02416 02478 02478 99999 00000	00000 02427 00002 02539
13670SET 13680 13690 13700	DORG TF SM TF BB DORG DAS	*-3 *+30,SETS+11 *+18,2,10 99999,SIGN *-9	02440 02448 02448 02460 02472 02484	26 12 26 42	02416 02478 02478 99999 00000	00000 02427 00002 02539

13750SEVENS	DC	10,7070707070	
			02527 00010
13760DCMAL	DC	10,0000000003	02537 00010
13770SIGN	DS	2	02539 00002
13780EXPNT2	DS	2	02541 00002
13790* 13800* SUBI 13810*	ROUTI	NE FOR PREPARING ID/CJ	_•
13820	DS	10	
13830FIXID	TR	OUTPUT-27, D-1	02551 00010
13840	CF	FIXID-10	02552 31 02488 02734
13850	TD	OUTPUT-26,FIXID-10	02564 33 02542 00000
13860	TD	OUTPUT-24,FIXID-9	02576 25 02489 02542
13870	T D	OUTPUT-22,FIXID-8	02588 25 02491 02543
13880	TD	·	02600 25 02493 02544
		OUTPUT-20,FIXID-7	02612 25 02495 02545
13890	TD	OUTPUT-12,FIXID-6	02624 25 02503 02546
13900	TD	OUTPUT-10,FIXID-5	02636 25 02505 02547
13910	TD	OUTPUT-8,FIXID-4	02648 25 02507 02548
13920	TD	OUTPUT-4,FIXID-3	02660 25 02511 02549
13930	TD	OUTPUT-2,FIXID-2	
13940	TD	OUTPUT,FIXID-1	02672 25 02513 02550
13950	BNF	*+36,FIXID-1	02684 25 02515 02551
13960	TFM	OUTPUT-14,20,10	02696 44 02732 02551
13970	CF	OUTPUT-15	02708 16 02501 00020
13980	ВВ		02720 33 02500 00000
		* ^	02732 42 00000 00000
13990	DORG	-	02734
140001D	DAC	15, 0000 000.000@	02735 00015
14010* 14020* SUBF 14030*	1 TUOS	NE TO FLOAT SEQUENCE NUM	1BER.
14040	D\$	3	02766 00003
14050FIXIT	TF	OUT, SEVNS	•
			02768 26 02847 02853

14060	CF	FIXIT-3					
14070	TD	OUT.FIXIT-1	02780	33	02765	00000	
•		•	02792	25	02847	02767	
14080	TD	OUT-2,FIXIT-2	02804	25	02845	02766	
14090	TD	OUT-4,FIXIT-3	02816	25	02843	02765	
14100	TF	CARD+158, OUT		-	_		
14110	вв		02828	26	00617	0284/	
14120	DORG	*=0	02840	42	00000	00000	
		-	02842				
14130	DAS	2	02843	000	002		
14 1400UT	DS	2	02847	000	102		
14150SEVNS	DC	6,707070	•				
14160	DEND	INIT	02853	000	000		
LOAD SUBROU	TINES		00782				
207.5 005.100					03308		
			02874	16	02998 03308	<u> </u>	
END OF PASS	11		02886	49	02998	0	

	S	SYMBUL	<u> </u>	() 10H		9-08-18			
04809 00415 00435 00435 01162 011290 01628 02092 02404	W S *NPRINT CARD LOOP3 *TFLOAT SKIP *FLTFIX *SETZRO *SETZRO *SETZRO DCMAL	000099 00418 00621 01054 011216 011218 011736 021736 021736 021736 02539	PROD MPL2 *COUNT1 *BLANKS LOOP2 *BFLOAT STOP *DECIML *EECIML SETS SIGN	00404 00422 00442 00782 01114 01554 01554 01554 01554 02198 02241 02541	M VPL2 *COUNT2 INIT ITER IDEN I END ITRUMT LARGE SEYNS	00408 00427 000426 001598 01126 01250 02200 02200 022515 02552	N INADD MP2X5 CAR CAR LOOP1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-1 1-00-00-00-00-1 1-00-00-00-1 1-00-00-00-1 1-00-00-00-00-1 1-00-00-00-00-00-00-00-00-0 1-00-00-00-00-00-00-0 1-00-00-00-00-00-00-00-00-0 1-00-00-00-00-00-00-00-00-00-00-00-00-00	00410 00432 00456 00886 01150 01627 02072 02342 02527	FORM *ROWADD TEMP GO CLASS TRAN ARG *WRALPH WRALPH WRALPH

14170* 14180* 14190*	LP20- NOV	7, MATRIX PUNCH . 16, 1962.	FOR RESTART, LINEAR PROGRAMMING,
14200	DORG	402	
14210M	ÐS	3	00402
14220N	DS	4	00404 00003
142.30F0RM	.DS	2	00408 00004
14240S	DS	<i>»</i> 5	00/410 -00002
14250MPL2	DS	·3	004-15 00005
14260	DS	64	90418 00003
14270TEMP	DS	10	00482 00064
14280PR0D	DS.	20,99	00492 00010
14290W	DS	480 9	00099 00020
	مويور	,, <u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	04809 00000
	CH MA	TRIX IN FLOATING	POINT FORMAT FOR RELOADING.
14320* 14330START	TDM	FORM, O	
14340	WNCD	M–2	00494 15 00410 00000
14350	TF	TEMP, N	00506 38 00402 00400
14360	.AM	TEMP, 2, 10	00518 26 00492 00408
14370	зM	TEMP, MPL2	00530 11 00492 00002
14380	SF	PROD-4	00542 23 00492 00418
14390	SM	PROD, 2, 10	00554 32 00095 00000
14400	TF	CMP+11.S	00566 12 00099 00002
14410	A	CMP+10.PROD	00578 26 00661 00415
14420	TF.	CMP2+11, CMP+11	00590 21 00660 00099
			00602 26 00745 00661
14430	SM	CMP+11,70,10	00614 12 00661 00070
14440	TFM	WR1 TE+6,W-9	00626 16 00716 04800
14450	A	WRITE+5,MPL2	00638 21 00715 00418
14460CMP	CM	WR1TE+6,99999	00 650 14 00716 99999

14470	BNP	WRITE				
144/0	DINI		00662	47	00710	01100
14480	TF	TDIG+6, WRITE+6	00674	26	00704	00716
14490	AM	TDIG+6,71,10	•		00704	
14500TD1G	TD	99999,400	00000	11	00/04	00071
14,500.0.4		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	00698	25	99999	00400
14510WR1TE	WNCD	99999	00710	38	99999	00400
14520	AM	WRITE+6,70,10	•	-	00716	
14530CMP2	СМ	WR1TE+6,99999	00/22	• •	00/16	00070
1477001112	0.1		00734	14	00716	99999
14540	BNP	CMP	00746	47	00650	01100
14550	RNCD	0	•		-	
			00758	36	00000	00500
14560	В	0	00770	Lа	00000	00000
14570	DEND	START	00770	7)	00000	00000
			00494			
END OF PASSI	1					

14580*	LP20-	-8, SOLUTION	TEST,	LINEAR	PROGR	MA	11 NG, 1	NOV.	16,	1962.
14590* 14600	DORG	402			00402					
14610M	DS	3			00404	00	202			
1462 ON	DS	4			00404		-			
14630F0RM	DS	2								
14640S	DS	5			00410					
14650MPL2	DS	3			00415		-			
14660	DS	1			00418		-			
14670W	DS	,4809			00419					
14680PR0D	DS	20,99			04809					
14690CNTCOL	. DS	3			00099					
14700CNTROW	DS	3			00422		-			
147101 NADD	DS	5			00425		-			*
14720	DS	56			00430		-			
14730START	TF	CNTROW,M			00486		-			
14740	TFM	SUB+28,W+20)				00425	_		
14750	TF	SUB+23,S			-		00576		-	
14760	Α	SUB+22,MPL2					00571		_	
14770	AM	SUB+23,10,1	0				00570	_		
14780SUB	FS	99999,99999)				00571	_		
				(0560	49	01085 01034	0000	0	
					00567 00572			9999 9999		
14790	AM	SUB+23,10,1		(00578	11	00571	0001	0	
14800	AM	SUB+28,10,1	0	(0590	11	00576	0007	0	
14810	SM	CNTROW, 1, 10)	(00602	12	00425	0000	1	
14820	ВP	SUB		(00614	46	00548	0110	00	
14830	TF	CNTCOL,N		(00626	26	00422	0040	8	
14840	TF	INADD,S					00430			
14850	Α	INADD-1,MPL	.2		_		00429			
				,	0000	- 1	30-FE)	3 O-T	, 5	

14860	Α	INADD-1,MPL2					
14870L00P	TF	CNTROW,M				00429	
14880	TF	FMUL+28, I NADD				00425	
14890	TF	CMP+6,FMUL+28				00870	_
14900	AM	CMP+6,10,10				00824	_
14910	TF	FMUL+23,CMP+6				00824	
14920	TF	FSUB+28,CMP+6				00865	
14930	TF	FSUB+23,S		• -		00900	
14940	Α	FSUB+22,MPL2				00895	
14950	AM	FSUB+23,10,10		00758	21	00894	00418
14960	TF	CMP2+6.FMUL+28				00895	
14970CMP2	СМ	99999,99,1011,	IS A(0			00800	00870
14980	BE	COLSTP		00794	14	99999	00055
14990CMP	СМ	99999,99,1011,	IS A(I			009 7 4	01200
15000	BE	MOD				99999	00099
15010FMUL	FM	99999,99999		00830	46	00902	01200
1501011102	• • • •))))))		00842		01085 01054	00865 00000
				00861	000	005	99999 99999
15020FSUB	FS	99999,99999		00872		01085	7 0895
						01034	00000
45020400	A 1.4	CMD (10 10		00896			99999 99999
15030M0D	AM	CMP+6, 10, 10		00902	11	00824	01000
15040	AM	FMUL+23, 10, 10		00914	11	00865	0000
15050	AM	FSUB+23,10,10		00926	11	00895	0000
15060	AM	FSUB+28,10,10		00938	11	00900	0T 000
15070	SM	CNTROW, 1, 10		00950	12	00425	00001
15080	BP	CMP		00962	46	00818	01100
15090COLSTP	Α	INADD-1,MPL2		00974	21	00429	00418

15100	SM	CNTCOL,1,10	00986 12 004	.22 00071
15110	вР	LOOP	00998 46 00	
15120	RNCD	0	01010 36 00	·
15130	В	0	01010 36 000	
15140	DEND	START	00488	300 00000
LOAD SUBROU	TINES		01034 16 014	1.88 M101.6
			01046 49 010 01054 16 014	074
END OF PASS	11		01066 49 01	
LIID OF TASS				

15150* 15160* 15170*	NOV	9, PARAMETRIC SOLUTION, LINEAR PROGRAMMING, . 16, 1962.
15180	DORG	402 00402
15190M	DS	3,, NUMBER OF RESTRAINING EQUATIONS. 00404 00003
15200N	DS	4,, NUMBER OF NONBASIC ACTIVITIES. 00408 00004
15210F0RM	DS	2,, FORM OF INPUT - 0 IMPLIES FLT. PT., 1 IMPLIES DECIMAL 00410 00002
15220S	DS	5,, REFERENCE ADDRESS FOR MATRIX, = W+10(M+3). 00415 00005
152 30MPL2	DS	3,,M+2 00418 00003
15240	DS	00419 00001
15250W	DS	,4809, REFERENCE ADDRESS. 04809 00000
15260PR0D	DS	20,99, PRODUCT ADDRESS. 00099 00020
152700UTPU	T DS	00429 00010
15280	DC	1.@
152 90R	DS	00430 00001 10,, MAX OR MIN RATIO FOR DUAL OR SIMPLEX ALGORITHM. 00440 00010
15300C0LAD	R DS	5,, ADDRESS OF D(K).
15310ROWADI	R DS	5. ADDRESS OF B(R).
15320ARKADI	R DS	00450 00005 5,, ADDRESS OF A(R,K). 00455 00005
15330CNTC0	L DS	3 COLUMN COUNTER.
15 340CNTRO	w DS	00458 00003 3,, ROW COUNTER.
	DS	00461 00003 10 TEMPORARY WORK ADDRESS.
15350TEMP1		00471 00010
15360TEMP2	DS	10,, TEMPORARY WORK ADDRESS. 00481 00010
15370BIMIN	DS	10,, MINIMUM B(I). 00491 00010
15380DJMI N	DS	10,, MINIMUM D(J).
15390A I KMA	x DS	10,, DENOMINATOR OF SIMPLEX RATIO, USED TO BREAK TIES.
15400	DC	8,99999999
154101NF	DC	2,99,, INFINITY. 00521 00002
15420	DC	8,-99999999 00529 00008

154 30NEG I NF	DC	2,99,, NEGATIVE INFINIT	Y. 00531	ດດດເ	02	
15440	DC	8,0	00539			
15450ZER0	DC	2,-99,, ZERO	00541			
15460	DC	8,10000000	00549			
154700NE	DC	2,1,, ONE.	00551			
15480ESSZER	DC	2,-07	00553			
15490MESS1	DAC	16,1 CANT FIND IT.@	00555			
15500MESS2	DAC	10,1D BASIC.@	00587			
15510MESS3	DAC	20, SOLUTION UNBOUNDED.				
15520MESS4	DAC	4,K= @	00647			
15530CNTR	DS	3	00656			
155400UT	DS	10	00666			
15550	DC	1,@	00667			
15560CARD	DS	80	00747			
155701 DEN	DS	4,CARD-76	00671			
15580SIGN	DS	1,CARD-74	00673			
	READ	CARD WITH ID OF PARAMETE				IGN.
15610* 15620START	RNCD	IDEN-3	00748	36	00668	00500
15630	SF	IDEN-3			00668	
15640* 15650*	FIND	PARAMETRIC VECTOR.	·	-		
15660* 15670*	(1).	IS IT BASIC.				
15680* 15690	TF	CNTR,M	00772	26	00656	00404
15700	TF	ILP+6,S	• •		00814	
15710	AM	1LP+6,4,10			00814	
157201 LP	С	99999, I DEN			99999	
15730	BE	FOUNDI				01200
15740	AM	ILP+6,10,10			00814	
			00054		30017	555,0

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•	v	

15750	•	0.175						13
15750	SM	CNTR,1,10		00844	12	00656	00001	
15760	BP	ILP		00856	46	00808	01100	
15770* 15780* 15790*	(2).	IS IT NON-BASIC.						
15800	TF	CNTR, N		00868	26	00656	00408	
15810	TF	JLP+6,1LP+6						
15820	Α	JLP+5,MPL2					00814	
15830JLP	С	99999, I DEN					00418	
15840	BE	FOUNDJ				99999	-	
15850	Α	JLP+5,MPL2					01200	
15860	SM	CNTR,1,10		00928	21	00909	00418	
15870	ВР	JLP		00940	12	00656	00001	
15880	RCTY			00952	46	00904	01100	
15890	WATY	MESS1,,,ERROR HALT,	ID NEIT	HER BA	sīc		ON-BASI	С.
15900	Н					00555		
15910	DORG	*=9		_		00000	00000	
15920FOUND1	BD	SUBTR,SIGN		00990				
15925	RCTY				_	01028		
15930	WATY	MESS2,,,ERROR HALT,	ID BASI	٠.	-	00000		
15940	Н					00587		
15950	DORG	*-9		01026	48	00000	00000	
15951SUBTR	TF	ZE+28,1LP+6		01028				
15952	AM	ZE+28,6,10		01028	26	01092	00814	
15953	Α	ZE+27,MPL2				01092		
15954ZE	TFLS	OUT,99999				01091		
				01064 01076 01083	49	02323 02292 05	01087 00000 00666	
15955	WATY	MESS4		01088			99999	
15956		OUT-9		01094	3 9	00647	00100	
15957	TF	ZE 1+23, ZE+28		01106	38	00657	00100	
15958ZE1		99999, ZERO		01118	26	01153	01092	
19790461	.1 63	JJJJJ, LLIKO		01130	16	02 32 3	01153	

15.05.0	В	TND	01 142 01 149 01 154	000		<u>0</u> 0000 99999 00 541
15959	В	END	01160	49	02188	00000
15960	DORG	*-3	01168			
15961* 15970* 15980*	TRANSI	FER VECTOR TO WORKING COLUMN.				
	TF	MOVE+28,JLP+6	01 168	26	01244	00010
16000	AM	MOVE+28,26,10				
16010	TFM	MOVE+23,W+20			01244	
16020	TF	CNTR,M	-		01239	-
16030MOVE	TFLS	99999,99999	01204	26	00656	00404
			01216 01228 01235 01240	49 000	105	0123 9 00000 <u>9</u> 9999 99999
16040	AM	MOVE+23,10,10	01246	11	01239	0 T 000
16050	AM	MOVE+28,10,10	01258	11	01244	0000
16060	SM	CNTR,1,10			00656	_
16070	BP	MOVE	•		01216	
16080* 16090* 16100	CHANGE BD	SIGN IF NEGATIVE.	01202	70	01210	01100
16110	В	MIN	01294	43	01314	00673
16120	DORG		01306	49	01442	00000
16130CH	TF	CNTR,M	01314			
16140	TFM	CHANGE+11,W+18	01314	26	00656	00404
			01326	16	013 49	0 4827
16150CHANGE		SETFLG, 99999	01338	44	01382	99999
16160	TF	*+18,CHANGE+11	01350	26	01368	01349
16170	CF	99 999	01362	33	99999	00000
16180	В	MOD	01374	49	01406	00000
16190	DORG	*-3	01382			
16200SETFLG	TF	*+18,CHANGE+11	01382	26	01400	01349
16210	SF	99999			99999	
16220MOD	AM	CHANGE+11,10,10	-	-	0134 9	

16220	CH	CNTD 1 10	132.
16230	SM	CNTR,1,10	01418 12 00656 00001
16240	BP ·	CHANGE	01430 46 01338 01100
16250* 16260* 16270*		•	B(I)/A(I,K), A(I,K) NEGATIVE.
16280MIN	TFLS	R, NEGINF	01442 16 02323 01465 01454 49 02292 00000 01461 00005 00440 01466 00005 00531
16290	TF	CNTR,M	01472 26 00656 00404
16300	TFM	CMP1+6,W+20	01484 16 01538 04829
16310	TF	TF1+28,S	01496 26 01632 00415
16320	AM	TF1+28,10,10	
16330	Α	TF 1+27,MPL2	01508 11 01632 00010
16340* 16350* 16360*	IS A(I,K) ZERO.	01520 21 01631 00418
16370CMP1	CM	99999,99,1011	01532 1 4 99999 000 99
16380	BE	STEP	01544 46 01778 01200
16390* 16400* 16410*	IS A(I,K) NEGATIVE.	01544 40 01770 01200
16420	TF	CMP2+11,CMP1+6	01556 26 01591 01538
16430	SM	CMP2+11,2,10	01568 12 01591 00002
16440CMP2	BNF	STEP,99999	01580 44 01778 99999
16450	TF	FDIV+28,CMP1+6	
16460TF1	TFLS	TEMP2,99999	01592 26 01662 01538
144700011	-	TEMPA 00000	01604 16 02323 01627 01616 49 02292 00000 01623 00005 00481 01628 00005 99999
16470FDIV	FD	TEMP2,99999	01634 16 02323 01657 01646 49 02272 00000 01653 00005 00481 01658 00005 99999
16480TF2	TFLS	TEMP1,TEMP2	01664 16 02323 01687 01676 49 02292 00000 01683 00005 00471 01688 00005 00481
16490FSUB	FS	TEMP1,R	01694 16 02323 01717 01706 49 02212 00000 01713 00005 00471 01718 00005 00440

16500 BNP STEP 01724 47 01778 01100 16510 TFLS R, TEMP2 01736 16 02323 00000 01759 00005 01750 00005 00005 000440 01755 00005 00005 000440 16520 TF ROWADR, TF1+28 01766 26 00450 01632 16530STEP AM CMP1+6, 10, 10 0176 26 00450 01632 16540 AM TF1+28, 10, 10 01790 11 01632 00010 16550 SM CNTR, 1, 10 01802 12 00656 00001 16560 BP CMP1 01814 46 01532 01100 16590** 1S PARAMETRIC SOLUTION BOUNDED. 16650** 1S PARAMETRIC SOLUTION BOUNDED. 16630 RCTY 01826 24 00438 00529 16640 H 01862 39 00607 0100 16650 DORG *-9 01876 16660** CHANGE SIGN OF R AND PRINT. 16690** CF R-2 16690** CF R-2 16700 RCTY 01888 34 00000 00102 16710 TFLS OUT,R 01900 16 02323 01922 16720 WATY MESSA,,,K= 01900 16 02323 01922 16730 WNTY OUT-9 01912 49 02292 16740** 01912 49 02005 00000 16750* OBTAIN NEW PARAMETRIC SOLUTION. 01954 26 00656 00404 16780 TFM PAR1+23,W+20 01966 16 02049 04829 16780 TFM PAR2+23,			133.
16520 TF ROWADR, TF1+28	16500		01724 47 01778 01100
16530STEP AM CMP1+6,10,10 16540 AM TF1+28,10,10 16550 SM CNTR,1,10 16560 BP CMP1 16560 BP CMP1 16570* 16580* 16600 C R-2,NEGINF-2 16610 BNE SIGNR 16620 RCTY 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 16650 DORG *-9 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16670* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16670* 16680* 16700 RCTY 16710 TFLS OUT,R 16720 WATY MESS4,,,K= 16730 WNTY OUT-9 16740* 16750* 16760 OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF PAR2+23,S 16900 TF PAR2+22, MP1 2	165 10		01748 49 02292 00000 01755 00005 00440
16540 AM TF1+28,10,10 01778 11 01538 00010 16550 SM CNTR,1,10 01802 12 00656 00001 16560 BP CMP1 01814 46 01532 01100 16570* 16580* 1S PARAMETRIC SOLUTION BOUNDED. 16590* 1S PARAMETRIC SOLUTION BOUNDED. 16690* C R-2,NEGINF-2 01826 24 00438 00529 16610 BNE SIGNR 01838 47 01876 01200 16620 RCTY 01850 34 00000 00102 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 01874 48 00000 00000 16650 DORG *-9 01876 16660* 16670* 16680* 16690SIGNR CF R-2 01876 33 00438 00000 16700 RCTY 01888 34 00000 00102 16710 TFLS OUT,R 01900 16 02323 01912 49 02229 00000 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01914 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 000466 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046 01924 00005 00046	16520	TF ROWADR, TF1+28	01766 26 00450 01632
16550 SM CNTR,1,10 01802 12 00656 00001 16560 BP CMP1 01814 46 01532 01100 16570* 16580* IS PARAMETRIC SOLUTION BOUNDED. 16590* C R-2,NEGINF-2 01826 24 00438 00529 16610 BNE SIGNR 01838 47 01876 01200 16620 RCTY 01850 34 00000 00102 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 01874 48 00000 00000 16650 DORG *-9 01876 16660* 16670* 16680* 16690SIGNR CF R-2 01876 33 00438 00000 16710 TFLS OUT,R 01900 16 02323 01923 01912 49 00292 00000 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 01919 019	16530STEP	AM CMP1+6,10,10	01778 11 01538 000T0
16560 BP CMP1 01814 46 01532 01100 16570* 1S PARAMETRIC SOLUTION BOUNDED. 16590* 16600 C R-2, NEGINF-2 01826 24 00438 00529 16610 BNE SIGNR 01838 47 01876 01200 16620 RCTY 01850 34 00000 00102 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 01874 48 00000 00000 16650 DORG *-9 01876 16660* 16670* CHANGE SIGN OF R AND PRINT. 16680* 16690* CF R-2 01888 34 00000 00102 16710 TFLS OUT,R 01900 16 02323 01923 01912 49 02292 000000 0192 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 00005 01919 0	16540	AM TF1+28,10,10	01790 11 01632 000 T 0
16560 BP CMP1 01814 46 01532 01100 16570* 16580* 15 PARAMETRIC SOLUTION BOUNDED. 16690* C R-2, NEGINF-2 01826 24 00438 00529 16610 BNE SIGNR 01838 47 01876 01200 16620 RCTY 01850 34 00000 00102 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 01874 48 00000 00000 16650 DORG *-9 01876 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16660* 16700 RCTY 01888 34 00000 00102 16710 TFLS OUT,R 01900 16 02323 01923 01912 49 02292 00000 01919 00005 000640 16720 WATY MESS4,,,K= 01900 16 02323 01923 01912 49 02292 00000 01919 00005 006460 16730 WNTY OUT-9 01942 38 00657 00100 16740* 16750* 08TAIN NEW PARAMETRIC SOLUTION. 16760 TFM PAR1+23,W+20 01966 16 02049 04829 16790 TF PAR2+28,W+20 01978 16 02084 04829 16790 TF PAR2+23,S 01990 26 02079 00415	16550	SM CNTR,1,10	01802 12 00656 00001
16580* 1S PARAMETRIC SOLUTION BOUNDED. 16590* 16600 C R-2,NEGINF-2 01826 24 00438 00529 16610 BNE SIGNR 01838 47 01876 01200 16620 RCTY 01850 34 00000 00102 16640 H 01874 48 00000 00000 16650 DORG *-9 01876 16660* 16660* 16670* CHANGE SIGN OF R AND PRINT. 16680* 16690SIGNR CF R-2 01876 33 00438 00000 16710 TFLS OUT,R 01900 16 02323 01923 01912 49 02292 00000 01919 00005 00666 01924 00005 00440 016750* 016740* 16750* 016740* 16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TFM PAR1+23,W+20 01966 16 02049 04829 16790 TFM PAR2+28,W+20 01978 16 02084 04829 16790 TFM PAR2+23,S 01990 26 02079 00415 16800 PAR2+22,NP12 16800 PAR2+22,	16560	BP CMP1	01814 46 01532 01100
16610 BNE SIGNR 16620 RCTY 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 16650 DORG *-9 16660* 16670* CHANGE SIGN OF R AND PRINT. 16680* 16690SIGNR CF R-2 16700 RCTY 16710 TFLS OUT,R 16720 WATY MESS4,,,K= 16730 WNTY OUT-9 16740* 16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TFM PAR1+23,W+20 16770 TFM PAR2+28,W+20 16790 TF PAR2+22, MP1 2 16800 A PAR2+22, MP1 2	16580*		
16620 RCTY 16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 16650 DORG *-9 16660* 16660* 16660* 16660* 16660RCTY 16680* 16690SIGNR CF R-2 16700 RCTY 16710 TFLS OUT,R 16720 WATY MESS4,,,K= 16730 WNTY OUT-9 16740* 16750* 16750* 16750* 16750* 16750* 16760 OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF CNTR,M 16770 TFM PAR1+23,W+20 16780 TFM PAR2+28,W+20 16790 TF PAR2+23,S 16900 A PAR2+22,NPI 2	16600	C R-2, NEGINF-2	01826 24 00438 00529
16630 WATY MESS3,,,SOLUTION UNBOUNDED. 16640 H 16650 DORG *-9 16660* 16670* 16680* 16670* 16690SIGNR CF R-2 16700 RCTY 16710 TFLS OUT,R 16720 WATY MESS4,,,K= 16730 WNTY OUT-9 16740* 16750* 16750* 16760 OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF CNTR,M 16770 TFM PAR1+23,W+20 16780 TFM PAR2+28,W+20 16790 TF PAR2+23,S 16900 A PAR2+22,MP12	16610	BNE SIGNR	01838 47 01876 01200
16640 H 16650 DORG *-9 16660* 16670* CHANGE SIGN OF R AND PRINT. 16680* 16690SIGNR CF R-2 16710 TFLS OUT,R 16720 WATY MESS4,,,K= 16730 WNTY OUT-9 16740* 16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TFM PAR1+23,W+20 16780 TF PAR2+28,W+20 16790 TF PAR2+23,S 16900 A PAR2+22,MPI 2	16620		
16650 DORG *-9 16660* 16670* CHANGE SIGN OF R AND PRINT. 16680* 16690SIGNR CF R-2 16710 TFLS OUT,R 16720 WATY MESS4,,,K= . 16730 WNTY OUT-9 16740* 16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TFM PAR1+23,W+20 16780 TFM PAR2+28,W+20 16790 TF PAR2+23,S 16800 A PAR2+22,MP12	16630	WATY MESS3,,,SOLUTION UNBOUNDED.	01862 39 00607 00100
16660* 16670* 16680* 16690SIGNR CF R-2 16710 TFLS OUT,R 16720 WATY MESS4,,,K= 16730 WNTY OUT-9 16750* 16750* 16760 OBTAIN NEW PARAMETRIC SOLUTION. 16770 TFM PAR1+23,W+20 16780 TF PAR2+28,W+20 16790 TF PAR2+23,S 16808 16908 A PAR2+22,MP12	16640	Н	01874 48 00000 00000
16670* CHANGE SIGN OF R AND PRINT. 16680* 16690SIGNR CF R-2 16700 RCTY 16710 TFLS OUT,R 16720 WATY MESS4,,,K= . 16730 WNTY OUT-9 16740* 16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF CNTR,M 16770 TFM PAR1+23,W+20 16780 TF PAR2+28,W+20 16790 TF PAR2+23,S 16800 A PAR2+22,MP12	16650	DORG *-9	01876
16690SIGNR CF R-2 16700 RCTY 16710 TFLS OUT,R 16710 TFLS OUT,R 16720 WATY MESS4,,,K= . 16730 WNTY OUT-9 16750* 16750* 16750* 16760 TFM PAR1+23,W+20 16780 TFM PAR2+28,W+20 16790 TF PAR2+23,S 16900 A PAR2+22,MP12 16700 01888 34 00000 00102 16900 16 02323 01923 01900 16 02323 01923 01912 49 02292 00000 01912 49 00292 00000 01912 49 00292 00000 01924 00005 01942 38 00657 00100 01942 38 00657 00100 01942 38 00657 00100 01954 26 00656 00404 01966 16 02049 04829 01978 16 02084 04829 01990 26 02079 00415	16670*	CHANGE SIGN OF R AND PRINT.	
16710 TFLS OUT,R 01900 16 02323 71923 01912 49 02292 00000 01919 00005 00666 01924 00005 00440 16720 WATY MESS4,,,K= . 16730 WNTY OUT-9 16740* 16750* 16750* 16760 OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF PAR1+23,W+20 16780 TFM PAR1+23,W+20 16780 TFM PAR2+28,W+20 16790 TF PAR2+23,S 01990 26 02079 00415		CF R-2	01876 33 00438 00000
16720 WATY MESS4,,,K= . 01930 39 00647 00100 16730 WNTY OUT-9 01942 38 00657 00100 16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF CNTR,M 01954 26 00656 00404 16770 TFM PAR1+23,W+20 01966 16 02049 04829 16780 TF PAR2+28,W+20 01978 16 02084 04829 16790 TF PAR2+23,S 01990 26 02079 00415	16700	RCTY	01888 34 00000 00102
16730 WNTY OUT-9 16740* 16750* 16760 16770 16780 16780 16780 16790 16790 16780 16790 16780 16790 16780 16790 16780 16790 16780 16790 16780 16780 16790 16780 16780 16790 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780 16780	16710	TFLS OUT,R	01912 49 02292 00000 01919 00005 00666
16740* 16750* 16760 TF CNTR,M 16770 TFM PAR1+23,W+20 16780 TF PAR2+28,W+20 16790 TF PAR2+23,S 01942 38 00657 00100 01954 26 00656 00404 01954 26 00656 00404 01966 16 02049 04829 01978 16 02084 04829 01990 26 02079 00415	16720	WATY MESS4,,,K= .	01930 39 00647 00100
16750* OBTAIN NEW PARAMETRIC SOLUTION. 16760 TF CNTR,M 01954 26 00656 00404 16770 TFM PAR1+23,W+20 01966 16 02049 04829 16780 TFM PAR2+28,W+20 01978 16 02084 04829 16790 TF PAR2+23,S 01990 26 02079 00415	16730	WNTY OUT-9	01942 38 00657 00100
16770 TFM PAR 1+23, W+20 01966 16 02049 04829 16780 TFM PAR2+28, W+20 01978 16 02084 04829 16790 TF PAR2+23, S 01990 26 02079 00415	16750*		01954 26 00656 00404
16780 TFM PAR2+28,W+20 01978 16 02084 04829 16790 TF PAR2+23,S 01990 26 02079 00415	16770	TFM PAR 1+23, W+20	
16790 TF PAR2+23,S 01990 26 02079 00415	16780	TFM PAR2+28,W+20	
16900 A PAR2+22 MPI 2	16790	TF PAR2+23,S	
	16800	A PAR2+22,MPL2	

16810	AM	PAR2+23,10,10	02 014	11 02079 00010	0
1682 OPAR 1	FM	99999,R	02 02 6 02 038	16 02323 02049 49 02252 00000 00005 99999	9
16830PAR2	FA	99999,99999	02056 02068	00005 00440 16 02323 02079 49 02232 00000 00005 99999	9
4601.0	414	DAD 4 00 10 10		00005 99999	9
16840	AM	PAR 1+23, 10, 10	02086	11 02049 00070)
16850	AM	PAR2+23, 10, 10	02 098	11 02 079 00010	כ
16860	AM	PAR2+28,10,10	02110	11 02084 00010	כ
16870	SM	CNTR,1,10		12 00656 00001	
16880	BP	PAR 1		46 02026 01100	
16890* 16900* 16910*	SET B	(K)=ZERO.	02134	46 02026 01100	,
16920	TF	ZER+23,ROWADR	02 146	26 02181 00450	נ
16930ZER	TFLS	99999,ZER0	02 158 02 170 02 177	16 02323 02181 49 02292 00000 00005 99999 00005 00541	1 0
16940END	RNCD	0	02 188	36 00000 00500	n
16950	В	0		49 00000 00000	
16960	DEND	START		49 00000 00000	•
LOAD SUBRO	UTINES		00748	46 00 TO 6 TO 4 OL	
THE OF PACE			02224 02232 02244 02252 02264 02272 02284 02292	16 02726 03184 49 02312 2 16 02726 03228 49 02312 2 16 02726 03728 49 02312 2 16 02726 03968 49 02312 2 16 02726 04304 49 02416 2	3 8 8
END OF PASS	011				

*COLADR TEMP1 I M F M S S I OUT I LP Z E I LP Z E TF LG T F I S I G N R 00418 000471 00521 00555 00666 00808 01130 01604 S *CNTROW *AIKMAX *ESSZER CNTR START ZE *CHANGE CHANGE CHANGE STEP 2 00415 000461 000461 00051 000553 000553 000748 01038 01138 01778 0 N FORM *COUTPUT COUTCOL DJMIN ONE MESS4 SIGN SUBTR CCH CMP1 FSUB ZER σ 00410 00429 00458 00551 00647 00647 01628 01312 01532 01532 W 80 N PROD *ARKADR BENIN ZER3 MESS3 DEN *FOUNDI MOVE MIN TF2 ₹ 1 000408 00099 000491 000541 000607 000990 011216 01142 01664 7 0 *ROWADR TEMP2 *NEG1NF MESSCARD JLP JLP MOD FD1V FD1V FD1V V 000404 04809 00450 000481 000531 000747 001168 011068 01634

16970* 16980*	LP20-	-10, PARAMETRIC DUAL, LINEAR PROGRAMMING, NOV. 16, 1962.
16990*	REMAR	RKS ON MACROS FOLLOW MACRO INSTRUCTIONS.
17000* 17010		6 402
1702 OM	DS	00402 3,, NUMBER OF RESTRAINING EQUATIONS.
17030N	DS	00404 00003 4,, NUMBER OF NONBASIC ACTIVITIES.
17040F0RM	DS	00408 00004 2,, FORM OF INPUT - 0 IMPLIES FLT. PT., 1 IMPLIES DECIMAL.
17050S	DS	00410 00002 5,, REFERENCE ADDRESS FOR MATRIX = W+10(M+3).
17060MPL2	DS	3,,M+2
17070	DS	00418 00003
17080W	DS	00419 00001 ,4809, REFERENCE ADDRESS.
17090PR0D	DS	04809 00000 20,99, PRODUCT ADDRESS.
171000UTPUT	DS	00099 00020
17110	DC	00429 00010
17120R	DS	00430 00001 10,, MAX OR MIN RATIO FOR DUAL OR SIMPLEX ALGORITHM.
		00440 00010
17130COLADR		5,, ADDRESS OF D(K). 00445 00005
17140ROWADR		5,, ADDRESS OF B(R). 00450 00005
17150ARKADR	DS	5,, ADDRESS OF A(R,K). 00455 00005
17160CNTCOL	DS	3,, COLUMN COUNTER. 00458 00003
17170CNTROW	DS	3,, ROW COUNTER.
17180TEMP1	DS	00461 00003 10,, TEMPORARY WORK ADDRESS.
17190TEMP2	DS	00471 00010 10,, TEMPORARY WORK ADDRESS.
17200BIMIN	DS	00481 00010 10,, MINIMUM B(I).
172 10DJMI N	DS	00491 00010 10,, MINIMUM D(J).
17220A KMAX	DS	00501 00010 10,, DENOMINATOR OF SIMPLEX RATIO, USED TO BREAK TIES.
172 30	DC	00511 00010 [°] 8,99999999
172401NF	DC	00519 00008 2,99., INFINITY.
•		00521 00002

17250	DC	8,-9999999	99		00500			
17260NEG NF	DC	2,99,, NEC	GATIVE	INFINIT				
17270	DC	8,0			00531			
17280ZER0	ЭC	2,-99,, ZI	ERO		00539			
17290	DC	8,10000000	ס		00541			
173000NE	DC	2,1,, ONE			00549	000	800	
17310ESSZER	DC	207			00551	000	002	
17320*		-, ,			00553	000	002	
17340* (17350* (17360* (17370* (17380*	1) C(2) SE 3) M(4) SE	M ENTIRE MADE PROPERTY OF THE PROPERTY OF T	PROCAL LL = ZI OLUMN	ERO. TO WORK	ING CO	LUM		
17390	DS	2			00555	000	002	
17400TRNMTX		1+23,ARKA	NDR		00556	26	00723	00455
17410	TF	12+23,COLA	NDR					00445
17420	TF	CNTROW,M						00404
17430	TF	FDIV1+28,4	RKADR		-			00455
17440	TFM	MOVELP+23,	W+10				-	0 4819
17450	TF	MOVELP+28,	COLADR				00758	_
17460	TF	PIVROW+23,	ARKADR				00873	-
17470MOVEK	TFLS	W,ONE						
17480FDIV1	FD	W.99999				49 000		
						49 000		
		S OF A(R,K 99999,ZERO						
17510* A	DDDEC	S OE A/D V		1	00700 00712 00719 00724	49 000		00723 00000 99999 00541
17510^ A		S OF A(R,K 99999,9999			20200	.,	00 75 -	30000
					10/30	16	02753	00753

							¥00±
17530*		COLADR.	00 7 42 00 7 49 00 75 4	000		00000 99999 99999	
1754012		99999,ZER0	00760 00772 00779 00784	49 000	05	00783 00000 99999 00541	
17550*	COLAD						
17560	AM	MOVELP+23, 10, 10	00790	11	00753	00000	
17570	AM	MOVELP+28, 10, 10	00802	11	00758	00010	
17580	AM	12+23,10,10			• •	00000	
17590	SM	CNTROW, 1, 10				_	
17600	BNN	MOVELP			00461		
•	W TFIS	99999.ONE	00838	46	00730	01300	
1701011410	, 1, 23	, , , , , , , , , , , , , , , , , , ,		49 000	02 722 05	00873 00000 99999 00551	
17620*	ADDRE	SS OF A(R,K).	00074	000	,0,	00,5,1	
17630* 17640*	(5) M	ULTIPLY PIVOT ROW BY RE	CIPROCA	AL O	F PIVO	T ELEM	ENT.
	(5) M	ULTIPLY PIVOT ROW BY RE PRLP+23,ROWADR					ENT.
17640* 17650*			00880	26	00927	00450	ENT.
17640* 17650* 17660	TF	PRLP+23,ROWADR	00880 00892	26 26	00927 00458	00450 00408	ENT.
17640* 17650* 17660 17670	TF TF	PRLP+23,ROWADR CNTCOL,N	00880 00892 00904 00916 00923	26 26 16 49	00927 00458 02753 02682	00450 00408 00927 00000 99999	ENT.
17640* 17650* 17660 17670	TF TF	PRLP+23,ROWADR CNTCOL,N	00880 00892 00904 00916 00923 00928	26 26 16 49 000	00927 00458 02753 02682 005	00450 00408 00927 00000 99999 04809	ENT.
17640* 17650* 17660 17670 17680PRLP	TF TF FM	PRLP+23,ROWADR CNTCOL,N 999999,W PRLP+22,MPL2	00880 00892 00904 00916 00923 00928	26 26 16 49 000 21	00927 00458 02753 02682 005 005	00450 00408 00927 00000 99999 04809 00418	ENT.
17640* 17650* 17660 17670 17680PRLP 17690	TF TF FM A	PRLP+23,ROWADR CNTCOL,N 99999,W PRLP+22,MPL2 CNTCOL,1,10	00880 00892 00904 00916 00923 00928	26 26 16 49 000 21	00927 00458 02753 02682 005 005	00450 00408 00927 00000 99999 04809	ENT.
17640* 17650* 17660 17670 17680PRLP 17690 17700	TF TF FM	PRLP+23,ROWADR CNTCOL,N 999999,W PRLP+22,MPL2	00880 00892 00904 00916 00923 00928 00934	26 26 16 49 000 21	00927 00458 02753 02682 005 005 00926 00458	00450 00408 00927 00000 99999 04809 00418	ENT.
17640* 17650* 17660 17670 17680PRLP 17690 17700 17710 17720* 17730*	TF TF FM A SM BNN	PRLP+23,ROWADR CNTCOL,N 99999,W PRLP+22,MPL2 CNTCOL,1,10	00880 00892 00904 00916 00923 00928 00934 00946	26 26 16 49 000 21	00927 00458 02753 02682 005 005 00926 00458	00450 00408 00927 00000 99999 04809 00418 00001	ENT.
17640* 17650* 17660 17670 17680PRLP 17690 17700 17710	TF TF FM A SM BNN	PRLP+23,ROWADR CNTCOL,N 99999,W PRLP+22,MPL2 CNTCOL,1,10 PRLP	00880 00892 00904 00916 00923 00928 00934 00946	26 26 16 49 000 21 12	00927 00458 02753 02682 005 005 00926 00458	00450 00408 00927 00000 99999 04809 00418 00001	ENT.
17640* 17650* 17660 17670 17680PRLP 17690 17700 17710 17720* 17730* 17740*	TF TF FM A SM BNN (6) T	PRLP+23,ROWADR CNTCOL,N 99999,W PRLP+22,MPL2 CNTCOL,1,10 PRLP RANSFORM ENTIRE MATRIX.	00880 00892 00904 00916 00923 00928 00934 00946 00958	26 26 16 49 000 21 12 46	00927 00458 02753 02682 005 00926 00458 00904	00450 00408 00927 00000 9999 04809 00418 00001 01300	ENT.
17640* 17650* 17660 17670 17680PRLP 17690 17700 17710 17720* 17730* 17740* 17750	TF TF FM A SM BNN (6) T TFM	PRLP+23,ROWADR CNTCOL,N 99999,W PRLP+22,MPL2 CNTCOL,1,10 PRLP RANSFORM ENTIRE MATRIX. ROWLP+6,W+10	00880 00892 00904 00916 00923 00928 00934 00946 00958	26 26 16 49 000 21 12 46	00927 00458 02753 02682 005 00926 00458 00904	00450 00408 00927 00000 99999 04809 00418 00001 01300 04819 00415	ENT.
17640* 17650* 17660 17670 17680PRLP 17690 17700 17710 17720* 17730* 17740* 17750 17760	TF TF FM A SM BNN (6) T TFM TF	PRLP+23,ROWADR CNTCOL,N 99999,W PRLP+22,MPL2 CNTCOL,1,10 PRLP RANSFORM ENTIRE MATRIX. ROWLP+6,W+10 14+11,S	00880 00892 00904 00916 00923 00928 00934 00946 00958	26 26 16 49 0000 21 12 46	00927 00458 02753 02682 005 00926 00458 00904 01036 01077	00450 00408 00927 00000 9999 04809 00418 00001 01300	ENT.

17790	TF	CNTROW, M	01018 26 00461 00404
17800ROWLP	CM	99999,99,1011, IS A(I	,K), WORKING COLUMN, EQUAL TO ZERO.
17810	BE	NXTROW	01030 14 99999 00099
17820	TF	ELLP+28,ROWADR	01042 46 01276 01200
1783014	TFM	15+23,99999,,S+10(M+2)	01054 26 01130 00450
17840	TF	CNTCOL, N	01066 16 01185 99999
17850	TF	151+6,15+23	01078 26 00458 00408
• -			01090 26 01198 01185
17860ELLP	PIVOT	ROW ADDRESS. INCREMENT	01102 16 02753 01125 01114 49 02722 00000 01121 00005 00481 01126 00005 99999 T= 10(M+2).
17880FMUL 17890*			01132 16 02753 01155 01144 49 02682 00000 01151 00005 00481 01156 00005 99999 RKING COLUMN. INCREMENT =10.
1790015	FS	99999, TEMP2	01162 16 02753 01185 01174 49 02662 00000 01181 00005 99999 01186 00005 00481
17910* 17920 51	S+10(I	M+2), ADDRESS OF FUNCT 99999,ESSZER,,SAME ADD	IONAL. INCREMENT =10(M+2). DRESS AS 15+23. INCREMENT= 10(M+2).
17930	BL	LOW	01192 24 99999 00553
17940	Α	ELLP+27.MPL2	01204 47 01716 01300
17950	A	151+5,MPL2	01216 21 01129 00418
	A		01228 21 01197 00418
17960		15+22,MPL2	01240 21 01184 00418
17970	SM	CNTCOL, 1, 10	01252 12 00458 00001
17980	BNN	ELLP	01264 46 01102 01300
17990NX TRO	M AM	ROWLP+6,10,10	01276 11 01036 00010
18000	AM	FMUL+28,10,10	01288 11 01160 000T0
18010	AM	14+11,10,10	01300 11 01077 00010
18020	SM	CNTROW, 1, 10	_
18030	BNN	ROWLP,,,IS MATRIX TRA	01312 12 00461 00001 NSFORMATION FINISHED. 01324 46 01030 01300

18040* 18050* 18060* 18070	(7) :	SWITCH ID/C ELEMENTS.				
18080	TF	SWITCH+11, COLADR	01336	26	01431	00450
18090	SM	SWITCH+11,10.10	01348	26	01419	00445
18100	TF	• •	01360	12	01419	00000
18110	S	16+6,SWITCH+11	01372	26	01426	01419
		16+10,MPL2	01384	22	01430	00418
18120	TF	17+6,16+11	01396	26	01438	01431
18130SWITCH		TEMP2,99999	01408	26	00481	99999
1814016	TF	99999,99999	01420	26	99999	99999
1815017	TF	99999,TEMP2	01432	26	99999	00481
18160	AM	ITER+11,1,10	01444	11	01491	00001
18170		BBACK	01456	47	01690	00100
18180	RCTY				00000	
181901 TER	TFM	OUTPUT,0,8			00429	
18200	WNTY	OUTPUT-3			00426	
18210	TBTY		_	-	00000	
18220	TF	PR1+28,S		-		
18230	Α	PR1+27, MPL2,, ADDRESS	OF FUNCT	ION		-
18240	TF	PR2+11,16+11,,ADDRESS	OF VARI	ABL		
18250	TF 1	PR3+11,16+6,, ADDRESS	OF VARI	ABL		
18260PR1	TFLS	OUTPUT, 99999			01665	
•			01576	49		00000
			01583 01588			00429 99999
18270		OUTPUT-9	01594	38	00420	00100
18280	TBTY		01606	34	00000	00108
18290PR2	TF	OUTPUT, 99999	01618			
18300	WNTY	OUTPUT-9	01630		_	
18310	TBTY		01642			

18320PR3	TF	OUTPUT, 99999	(-1		
18330	WNTY	OUTPUT-9			42 9 99999
18340	RCTY			-	420 00100
18350BBACK	BNC2	*+24	•	-	000 00102
18360	Н		-		714 00200
18370	ВВ		•		00000 0000
18380	DORG	*-9	•	42 000	00000 0000
18390L0W	TF	TFL+23,151+6	01716		
18400TFL	TFLS	99999,ZERO	-		751 01198
			01740 01 7 47	16 027 49 027 00005 00005	753 01751 722 00000 99999 00541
18410	В	151+24			16 00000
18420	DORG	*-3	01766	4) 01 2	.10 00000
18450*		ELECT SMALLEST B(I).	01700		
18460DUAL	TFLS	BIMIN, ZERO			753 01789 722 00000
			01785	00005	00491
18470	TF	CNTROW,M	01785 01790	00005	00491 00541
18470 18480	TF TF	CNTROW,M CMP1+28,S	01785 01790 01796	00005 00005 26 004	00491 00541 61 00404
		-	01785 01790 01796 01808	00005 00005 26 004 26 019	00491 00541 661 00404 002 00415
18480	TF	CMP1+28,S	01785 01790 01796 01808 01820	00005 00005 26 004 26 019 21 019	00491 00541 661 00404 002 00415 001 00418
18480 18490 18500	TF A AM	CMP1+28,S CMP1+27,MPL2	01785 01790 01796 01808 01820 01832 01844	00005 00005 26 004 26 019 21 019 11 019 16 027	00491 00541 661 00404 602 00415 601 00418 602 00070 653 01867
18480 18490 18500	TF A AM	CMP1+28,S CMP1+27,MPL2 CMP1+28,10,10 TEMP1,BIMIN	01785 01790 01796 01808 01820 01832 01844 01856 01863	00005 00005 26 004 26 019 21 019 11 019 16 027	00491 00541 661 00404 602 00415 601 00418
18480 18490 18500 18510B1COMP	TF A AM TFLS	CMP1+28,S CMP1+27,MPL2 CMP1+28,10,10	01785 01790 01796 01808 01820 01832 01844 01856 01863 01863 01874 01886 01874	00005 00005 26 004 26 019 21 019 11 019 16 027 49 027 00005 16 027 49 026 00005	00491 00541 661 00404 602 00415 601 00418 602 00010 753 01867 700491 753 01897 762 00000 00471
18480 18490 18500 18510BICOMP 18520CMP1	TF A AM TFLS	CMP1+28,S CMP1+27,MPL2 CMP1+28,10,10 TEMP1,BIMIN	01785 01790 01796 01808 01820 01832 01844 01856 01863 01863 01874 01886 01874	00005 00005 26 004 26 019 21 019 11 019 16 027 49 027 00005 16 027 49 026	00491 00541 661 00404 002 00415 001 00418 002 00010 53 01867 22 00000 00471 00491
18480 18490 18500 18510B1COMP	TF A AM TFLS FS	CMP1+28,S CMP1+27,MPL2 CMP1+28,10,10 TEMP1,BIMIN TEMP1,99999	01785 01790 01796 01808 01820 01832 01844 01856 01863 01868 01874 01886 01893 01898	00005 00005 26 004 26 019 21 019 11 019 16 027 49 027 00005 16 027 49 026 00005 00005	00491 00541 661 00404 602 00415 601 00418 602 00010 753 01867 700491 753 01897 762 00000 00471

10.F.COMINDI	TELE	BIMIN GOODS					
18560MI NB I	IFLS	BIMIN, 99999	01928 01940 01947 01952	49		01951 00000 00491 99999	
18570	TF	ROWADR, MINBI+28,, SETUP	ROW AD	DRE	SS FOF 00450	MATRIX	TRANSF
1858OROWSTP	SM	CNTROW, 1, 10			00450		
18590	ВР	BICOMP-12			01832		
18600* 18610* SEI	LECT I	LARGEST R= D(J)/A(R,J).	01902	40	01032	01100	
18620* 186301N1TCL	TFLS	R, NEGINF					
			01994 02006 02013 02018	49 00		02017 00000 00440 00531	
18640	TFM	COLADR,O			00445		
18650	TF	CNTCOL, N					
18660	ŤF	TSTARJ+6,ROWADR			00458		
18670	TF	C\$1+28,S			02150	-	
18680	Α	CS1+27,MPL2			02220		
1869ORETURN	Α	TSTARJ+5,MPL2	•		02219		
18700	TF	CMP2+6,TSTARJ+6			02149		
18710	SM	CMP2+6,2,10			02174		
18720	TF	FDIV2+28,TSTARJ+6			02 174		
18730	Α	CS1+27,MPL2			02250	-	
1874OTSTARJ	СМ	99999, 99, 1011			02219		
18750	BE	COLSTP			99999 02378		
18760CMP2	С	99999,ZERO-2					
18770	ВР	COLSTP			99999 0 2 378		
18780CS1	TFLS	TEMP2,99999					
40700t	DOD 5.0	0.05.0(1)		49 000			
		S OF D(J). TEMP2,99999	02222	16	02752	<u>⊼</u> 221. ⊏	
			02222	10	02/53	02245	

		SS OF A(R,J).	02234 02241 02246	000		00000 00481 99999	
18820		TEMP1,R	02252 02264 02271 02276	49 000			
18830	FS	TEMP1,TEMP2		49 000			
18840	BP	COLSTP	02 312	46	02 378	01100	
18850	TFLS	R,TEMP2	02 324	16 49 000	02753 02722 05	02 347	
18860	TF	ARKADR, FDI V2+28	02354	26	00455	02250	
18870	TF	COLADR, CS1+28			00445	_	
18880COLSTP	SM	CNTCOL,1,10			00458		
18890	ВР	RETURN			_		
18900	CM	COLADR,O			02084		
18910	BNE	BTM1			00445		
18920	RCTY			•	02458		
18930	WATY	MESS1		-	00000		
18940	В	END	-		02495		
18950	DORG	*-3	02450	49	02470	00000	
18960BTM1	втм	TRNMTX,0,10	02458				
18970END	RNCD		02458	17	00556	00000	
18980	В	0	02470	36	00000	00500	
18990MESS1	DAC	22.INCONSISTENT		49	00000	00000	
19000		2662	02495	000	022	-	
19010		DUAL	02662				
LOAD SUBROU		224	01766				

```
02662 16 03156 03614
02674 49 02742 9
02682 16 03156 04158
  SYMBOL TABLE,
  LP20 - 10.
                                                            02694 49 02742 9
02702 16 03156 04398
02714 49 02742 9
02722 16 03156 04734
02734 49 02846 9
END OF PASSII
                                                                                                            MPL2
                                                                                                00418
00404
                        00408
                                    N
                                                00410
                                                            FORM
                                                                        00415
           М
                                                                                                00445 *COLADR
00471 TEMP1
00521 INF
04809
                        00099
                                    PROD
                                                00429
                                                         *OUTPUT
                                                                        00440
            W
                                                                        00440 R
00461 *CNTROW
00511 *AIKMAX
00553 *ESSZER
00730 *MOVELP
                                                                                                            TEMP1
                        00455
                                                00458
                                                         *CNTCOL
00450
00481
         *ROWADR
                                 *ARKADR
                        00491
                                    BIMIN
                                                00501
                                                            DJMIN
            TEMP2
                                                                                                 00556 *TRNMTX
00760 | 12
                                                00551
00700
01030
00531
                        00541
                                    ZERO
                                                            ONE
         *NEG! NF
00640
            MOVEK
                        00670
                                    FOIV1
                                                            11
                                                                                                            ELLP
                                                                                                 01102
                        00904
01162
                                    PRLP
                                                            ROWLP
                                                                        01066
                                                                                    14
00850
         *PIVROW
                                                                                                01408 *SWITCH
01618 PR2
                                    15
                                                                        01276 *NXTROW
01564 PR1
01728 TFL
            FMUL
                                                01192
01132
                        01432
                                                01480
                                                             ITER
            16
                                                                                                 01766
                                                                                                             DUAL
            PR 3
                        01690
                                    BBACK
                                                01716
                                                            LOW
01654
                                                                                                         *ROWS TP
                                                                                    MINBI
                                                                                                 01970
                                                01916
02144
                                                         NEGA
*TSTARJ
                                                                         01928
01844 *BICOMP
                        01874
                                    CMP 1
                        02084 *RETURN
02378 *COLSTP
                                                                                    CMP2
                                                                                                 02192
                                                                         02168
01994
         *INITCL
                                                02458
                                                                         02470
                                                                                    END
                                                                                                 02495
                                                                                                            MESS<sub>1</sub>
                                                            BTM1
02222
            FDIV2
```

- V.B. FORMAT FOR MEMORY CLEAR AND CONDENSED PROGRAM LOADER.
- (1). TWO CARD MEMORY CLEAR ROUTINE, USED WITH LP20-1.

 36002400050‡26000470005416000540000111000540000031001390001045000120024049002420

 001600035001002600090002991700060007400393600000005004900000001234567891234567890
 - (2). SIX CARD LOADER.

- 3600100005003600180005003600260005004900660\$160007900166260007400163250040200166
 (LOADS INTO FERO)

 RESTART ADDRESS
- 11001630000111000790000112001650000147000560120036001590050045000440016049000000 (LOADS INTO 80)
- 01234567891234567890234567890134567890124567890123567890123467890123457890123456
- 456783073456783072456789072356789072346789072345789072345689072345679072345678‡0

(LOADS INTO 260)

1716

(4). ILLUSTRATION OF FORMAT FOR REMAINING CARDS.

- A = ADDRESS WHERE DIGIT IN COLUMN 8 IS LOADED.
- B = NUMBER OF DIGITS ON CARD TO BE TRANSMITTED
- C = DATA LOADED INTO AADDRESS AND HIGHER LOCATIONS.

LP20-1, OBJECT DECK LISTING

31000800006049000720000000000172076875423380658670000000000005004900000±36000000 36002400050‡26000470005416000540000111000540000031001390001045000120024049002420 0016000350010026000900029917000600014003936000000500490000001234567891234567890 3600100005003600180005003600260005004900660+160007900166260007400163250040200166 $1100163000\overline{0}11100079000\overline{0}11200165000\overline{0}147000560120036001590050045000440016049000000$ 01234567891234567890234567890134567890124567890123567890123467890123457890123456 4567890134567890124567890123567890123456789012345789012345689012345679012345678 50694730034000000102340000000102360040200500320040200000320040600000160041554800076773926004290040411004290000**32**10041400429120042900001260041800429150041900000 0840734300364004101600906048002100905004182600923009061100923000713699999005004 0091373500932999949026080110090600070110092300070490090002600429004081100429000

00986730323004180042916011010479932000960000021011000009916010710480916026630107 Ō1059731490263299999Ō065901101071000T01401071999994701048011001600431000Ō1370045 01132735005002500491004002500531004002500571004002500611004004301322004561400431 012057300004470125401200160130100456160132100454490111401100431000011110130100040 51278731101321000404301310504564901198031004545045425004360045525004370045725004 01351733800459320043600000320045800000140045900070460141801300320043800000250043 71424739004632500440004652500441004673200439000003200466000001400467000704601514 71497730130032004410000033004580000033004660000014004380099946026080120026025930 31579730415260042900441110042900001230041800429210009900438320009600000210259200 \[01716\]7371259999999991101724000\[000711101729000\[000721100435000\[00071400435000\]7047017180120 01789730320048800000140048900070460186201300140048900000460186201200320045100000 51862733300490000003200442000002699999004514901198044019260043849016820250049100 51 335734003100616004703200616000001400617000704602086013001400617000204602066012 02008730043020860061733004520000032006180000031006160061849020980320045200000490 02081732034033004520000016006430000016021520061716021400061832999990000014999990 <u>52154730063460221401200110215200062110214000062110064900061490213402602261021402</u> 022277360225602152120225600001319999999999943023180061731006160061812006490000145

02300730226200617490119801600433000091602377006171602392006381602397006174502386 $\overline{0}2373\overline{7}3999994902454025999999999991102377000\overline{0}21102392000\overline{0}11102397000\overline{0}21200433000\overline{0}1$ $\bar{0}2519\bar{7}36604402546004523200645000003200638000002600647006451602663\bar{0}25934902632\bar{9}99$ 0259273990064904901198036000000500490000000001603066035244902756#2602719000004 02665734027080271933027190000026027190271949026640260336300000260275502719120275 02738735000022603361000001503011000022602791026632603110000001102663000052602827 52811730266326028830000044028720288333028830000026028830288349028280260339500000 $\overline{0}2884\overline{7}32602919028831202919000\overline{0}22603393000002603134026634402976031103303110000002$ 02957736031100311049029320260312203110120312200002110313400000120301100001470304 03030738012001503011000024603060014004900000044030920009932033610000011033610000 53103730260000003363260000003361490000000000+340000000102380313000100430318800401 03176734803393033942603361034262603363034284903292034000000010238031300010044032 032497368004014870000100002603**361**0341**526**033630341**7**490000003400000001023803130001 03395730‡T000000001‡0000000039‡9999999999‡T000000000004342944819**076**9230**76**909090 0346873909091111111111111428571428200000000033333333333000000000000026033630339526033

LP20-1, OBJECT DECK LISTING

Ō076773400790048053200433000003304805000002504806004004300882999991100825000**Ō112** 00913730042633999990000044009540043332048070000032048000000016017070098949016769 01053730988004181100643000702600631004192601007004192600422004081600936011721600 01132739430004116010330004916010380119249006080320480700000490095402600439004082 ñ1278730010210135700418160138804829260141301251260043600404160170701353490167600 Õ1 35 17 3449³⁹999901601707Ō13834901656Ō0449<u>9</u>999901601707Ō14134901636Ō9999Ō044901101 ñ142473358000T01101388000T01200436000Ō14701330012001101358000Z01601388Ō482921014 01407731200418120043900001460131801300470161200100340000000102340000000102390045 515707319010039005490010034009000010234000000010236000000050049000000000160211001643730261249016960160211003112490169601602110033524901800026017630000044017520 01716731763330176300000260176301763490170802602407000002601799017631201799000**0**22 01789736024050000015020550000226018350170726021540000011017070000526018710170726 01935730192712019630000226024370000026021780170744020200215433021540000026021540 ñ2008732154490197602602166021541202166000ñ21102178000ñ01202055000ñ14702092012001 ñ2.08173502.05500002460210401400490000004402136000<u>9</u>932.0240500000110240500000260000

0215473002407260000002405490000000000±3400000001023802174001004302232004014802437 Ō244673000Ō1‡Ō000000999‡9Э99999999999100000000004342944819Ō769230769Ō90909090911 $\overline{0}2665\overline{7}30801100310240902430310243002398310239802409220243902407460213601400210283$ <u>02738739024394402768024371502829000021402439000074602828011004702136012001502429</u> 02811730000033024300000021024050000025000990240516023420211247029640140011024070 02884730001470292001400160218200001490218402602405024041502398000013302399000004 02957739021120460231201200330240500000260243902407430308002398310239802399250240 73030735716951202439000714703000014001602182000724902264032023980000026024070243 03103739490211201602342021122302405024374602312012004303204000841602418000**0**73200 $\bar{0}3249\bar{7}34002102407024184702112014004403308024071602182000\bar{0}44902264021024070241847$ ñ33227302244013001602182000**ñ3**490218402602407024**3**9260240502437490214800000000000 $00000000000102\,03040002\,0406080003060902\,10040802\,16100500\,15\,10200602\,18\,142\,007\,04\,112\,82$ 00806142230030817263000000000050607080900121416181518112427202428223635203530454 03632484455324946536048465462754453627180123456789123456789023456789013456789012

36000000050036000800050036003000050036003220050049001280000000000000000000000000 3600100005003600180005003600260005004901754+160007900166260007400163250040200166 11001630000111000790000112001650000147000560120036001590050045000440016049000000 012345678912345678902345678901345678901245678901235678901234678901234578901234578 456789013456789012456789012356789012346789012345789012345689012345679012345678+0 ~0.5487300~0.70026007230045526007830044526004610040426006980045516007530481926007 **- 006 3473 3939 30160275 30072 3490272 299999005410160275 30075 3490272 299999999990160275 3** 07677307834902722999900541011007530007011007580007011007830007012004610000146 @08407300730013001602753@0873490272299999@055102600927004502600458004081602753@0 00913739274902682999990480902100926004181200458000014600904013001601036048192601 00986730770041521010760041816011600481926004610040414999990009946012760120026011 01059733000450160118599999260045800408260119801185160275301125490272200481999990 01132731602753011554902682004819999901602753011854902662999990048102499999005534

01278730103600010110116000010110107700010120046100001460103001300260143100450260 01351731419004451201419000702601426014192201430004182601438014312600481999992699 \bar{0}1424\bar{7}3999999992699999004811101479000\bar{0}147016780010016004290\bar{0}00038004260010034000 714377300001082601580004152101579004182601617014312601653014261602753701575490272 ñ1570732ñ0429ñ999903800420001003400000001082600429999993800420001003400000001082 51643736004299999938004200010034000000010247017020020048000000000042260173901198 Ō1716731602753Ō17394902722丏99999Ō0541049O121601602753Ō177749O2722Ō0491Ō0541O26004 71789736170404260189000415210188900418110189000070160275301855490272200471004910 71862731602753018854902662004719999904701958011002601944018901602753019394902722 ñ1 93573ñ04919999902600450019441200461000ñ14601820011004402448004891602753ñ201749 $\overline{0}2008\overline{7}302722\overline{0}0440\overline{0}053101600445\overline{0}0000260045800408260215000450260222000415210221900$ <u> 52081734182102149004182602174021501202174000522602250021502102219004181499999000</u> 02227735302245490270200481999990160275302275490272200471004400160275302305490266 7237373022201200458000701460208401100140044570000047024280120048170055600070490175

02665733156036144902742016031560415849027420160315604398490274201603156047344902 0273873846026028090000044027980280933028090000026028090280949027540260345300000**2** $\overline{0}2811\overline{7}3602845028091202845000\overline{0}22603451000001503101000022602881027532603200000011$ $\overline{0}2884\overline{7}302753000\overline{0}526029170275326029730000044029620297333029730000026029730297\overline{3}490$ $\overline{0}2957\overline{7}3291802603485000002603009029731203009000\overline{0}226034830000026032240275344030660$ $\bar{0}3030\bar{7}3320033032000000026032000320\bar{0}490302202603212032001203212000\bar{0}21103224000\bar{0}01$ $\bar{0}3103\bar{7}3203101000\bar{0}147031380120015031010000246031500140049000000440318200099320345$ 0317673100000110345100000260000003453260000003451490000000000±3400000001023803220 $\bar{0}3249\bar{7}30010043032780040148\bar{0}34830348426034510351626034530351849033820340000000102$ $03322\overline{7}338032200010044033580040148\overline{1}0000100002603451035052603453035074900000034000$ $\overline{0}3614\overline{7}3440364603483330348300000490365803203483000001503875000011603885\overline{0}348324034$ 036877353034854603874012004603754011003103455034763103476034444310344403455220348 03760735034534603182014002103885034854403814034831503875000021403485000074603874 03906733158470401001400110345300001470396601400160322800001490323002603451034501

3600100005003600180005003600260005004901754 \$\pm\$1600079\dot{0}016626000740016325\dot{0}0402\dot{0}0166 01234567891234567890234567890134567890124567890123567890123467890123457890123456 456789ÖT3456789ÖT2456789ÖT2356789ÖT2346789ÖT2345789ÖT2345689ÖT2345679ÖT2345678+0 01716731602753017394902722999990054104901216016027530177749027220050100541026004 01789735800408260186000415210185900418210185900418160275301855490272200471999990 ñ1862731602753ñ18854902662ñ0471ñ050104601958013002601944018601602753ñ1939490272**2** 32 0087 302 75 372 02 94 902 72 27044 0705 2 10 16 00 4 50 70 00 00 26 00 4 6 1 00 4 0 4 26 02 1 4 6 00 4 4 5 26 02 1 7 5 0 2 022277390270204819999901602753022674902722004710048101602753022974902662004710 7230073440046024120110046024920120026023680214616027537023634902722705117999990160 $\bar{0}2373\bar{7}32753\bar{0}23934902722\bar{0}0440\bar{0}048102600450022121200461000\bar{0}14702584011001102146000$ 02446731011021750001011022120001011022420001049021400160275302515490272200471005 $\overline{0}2519\overline{7}31102602562021461602753\overline{0}25574902662\overline{0}0471\overline{9}9990470232801300490241201400450\overline{0}$ <u>02532730900470261031200482603455023681700556000004901754036000300350049000000160</u>

00806142230090817263000000000050607080900121416181518112427202428223635203530454 03632484455324946536048465462754453627180123456789123456789023456789073456789072

LP20-5A, OBJECT DECK LISTING

Ō1643Ō321601686Ō232922016860145122016860145125999999999991101691000Ō11101686000Ō2 Ō1716731401686Ō23274701680011002601847016911602365000Ō52202365014511601823Ō23512 $\bar{0}1862\bar{7}301842000\bar{0}21401842\bar{0}2339470183601100430191602321490222801502339000002602319$ <u>02008732014514901836026023220234444020820145116023190002033014510000033023200000</u> $\bar{0}2154\bar{7}31602172\bar{0}2331259999999999991102177000\bar{0}11102172000\bar{0}21402172\bar{0}23394702166011004$ $\overline{0}2227\overline{7}321602251\overline{0}23234302272023231102251000\overline{0}2490224002602302022511202302000\overline{0}22699$

02519735160232500020330232400000427070707000000707070037070700±1603010034684902 \(\overline{0}\)2665\(\overline{7}\)3602699026631202699000\(\overline{0}\)26033050000015029550000226027350260726030540000011 **7**490 $\overline{0}2811\overline{7}3277202603339000002602863028271202863000\overline{0}226033370000026030780260744029200$ ñ2884733954339395400909260395493954499287602603966039541203966900021103978999001 ñ3103730010043031320040148ñ3337033382603305033702603307033724903236034000000102

310003000050049000720000000003847851684951136010**5**000000000005004900000#36000000 01234567891234567890234567890T34567890T24567890T23567890T23467890T23457890T23457 4567^Q ¹013456780012456780012356780012346780012345784012345680012345679012345678+0 ¬0543¬3000000000000000000000000000000±466455436349565541530033000±4241624 უი6 47 3455 ვიიიიიიიიიიია£94400000000435100000000000000000062484144566600**57**59494 ში~1373იიიიიიიიიიიიი იიიაიინგში1036იი7760050036008560050039007770040031004240 ში⇔847ვე77626ეე4490061126010540ე415210105300418160309101049490306001834999990260 3105°730471027212702974009401100940000313900425004003100424007763900777004002600 51132734510064127029740094011009400000139004250040031004240077639007770040026004 $\overline{0}1205\overline{7}307007072702974009401100940000\overline{0}1390042500400310042400776390077700400260042$ 71278732004042601355004152601396013552101395004181101355000701101396000702702758 013517339999250045102721160309101391490306001834099999026004810272127029740094011

714 77 304870077 32702 97400940110094000013900425094003100424007763900777004002600 31570734229949826016999941521016899941821016899941826016499169912016490907027027 516437353 2343260045102721160309151685490306051834999990260048102721270297400940 Შ1716₹311009400001390042500400310042400**776**2101648004182101689004181200422000<u>0</u>14 51789736016380110036000000050049000000000000000003301824000002602721027333302 51862737120000026027110274316027020050016027450005044019420183115027440000233018 $\overline{0}1935\overline{7}331000001401833000\overline{9}94602278012001401833000\overline{0}04702324011001401833000\overline{0}4460240$ <u>52081730005111020680007214020687270947020620110026022290207316027470007522027470</u> $\overline{0}2154\overline{7}318331602205\overline{0}27332202205027472202205027472102709999991602224\overline{0}2713250271300$ 72227730001102229000011102224000021402224022214702218011004302298027034902610015 $52300730272100000260270102745421401833000\overline{0}44702404011001602229\overline{0}18241602224\overline{0}27132$ $\overline{0}2373\overline{7}320222401833220222401833490221802602704027264402464018331602701000\overline{2}0330183$ $\overline{0}2446\overline{7}330000033302702000002502705018332502703018323302703000002602709027453302708$ 72519730000016025597182416025547271325999999999911025590007111025540007214025547 $\overline{0}2592\overline{7}32721470254801100421602633\overline{0}27054302654027051102633000\overline{0}24902622026026840263$ <u>72738730000013000000000000000031026940294033027480000025026950274825026970274925026</u> 72811739902750250270102751250270902752250271102753250271302754250271702755250271

 $\overline{0}2.957\overline{7}3070037070700 \pm 000026030530305933029710000025030530297325030510297225030490$ 03030732971260058303053420000007070701603494039524903184026031470000044031360314 0310373733314700000260314703147490309202603791000002603183031471203183000022603 73176737890000015034390000226032190309126035380000011030910007526032550309126033 73249731100000440330003311330331100000260331103317490325602603823000002603347033 03322731112033470000226038210000026035620309144034040353833035380000026035380353 \$\overline{0}33\)573\overline{0}490336002603550035381203550000\overline{0}21103562000\overline{0}01203439000\overline{0}14703476012001503 334687343900002460348801400490000004403520000993203789000001103789000000260000003 $\bar{0}3541\bar{7}3791260000003789490000000\bar{0}0 \\ \mp 34000000010238035580010043036160040148\bar{0}3821038$ 3614732226037890385426037910385649037200340000000102380355800100440369600401487 ቫ3687730000100002603789038432603791038454900000034000000010238035580010048050000 Ე38₹3**7**₹Ე1¢Ი0000000Ე₸₺±Შ9२१9999₱±₹10000000000**004342**944819**0**7692**307**69**0**9090909**0**₹**1111**1 <u>53996731111174285714282000000000533333330000000000260401803538260399404018120</u> 908061422390993172630000000000050607080900121416181518112427202428223635203530454 03632434455324346536048465462754453627180123456789123456789**0234567**89**0134567**89**01**

OBJECT DECK LISTING, LP20-6

31000800000000050049000000\$36000000 36020000500360008000500360030000500360032200500490012800000000000000000000000000 3600100005003600180005003600260005004900782*160007900166260007400163250040200166 11001630000111000700000112001650000147000560120036001590050045000440016049000000 Ე12.345678012.3456780<u>02.3456780</u>013456780<u>012456789</u>012356789012346780012345780012345780 <u>\$56700013456780012456780012356789012346789012345789012345689012345679012345678</u> 00913730418004041100418000022600422004081100422000021600427048092100426004181600 ᲔᲔᲛᲕ**Ნ**ᲨᲕ4,35ᲛᲔ₱9513004180ᲛᲔ**Ნ**03200Მ950ᲛᲔᲛᲔ**0**044600Მ9926004320042726004410041831004 Ე105∩735800620260043800435160128400485260119000432110112500001170276800ひ00260116 71132731011901201161000714401254999991602905011854902854004569999901400456000994 7120573601290012001602905712394902874716287045604901278026012770119027025529999 $\overline{0}1278\overline{7}32699999025152101189004181101284000\overline{3}01200438000\overline{0}14601126011004701382003003$ Ე1,351₹3000450010034000000102400130403000459004001100432000₹01200441000<mark>0</mark>1460105

166.

7142473401100470147400300340000001023400000001024901498039006210040039006210040 71497730210042700446220042200435240042200435470155401100490103002600435004221601 ñ157973499000491601504ñ1598490103003600000050049000000000000000330161800000260 $\overline{0}1351\overline{7}390045900100340000000102490139403900459004001100432000\overline{1}01200441000\overline{0}1460105$ $\overline{0}1424\overline{7}3401100470147400300340000001023400000001024901498039006210040039006210040$ 01497730210042700446220042200435240042200435470155401100490103002600435004221601 ñ157073499000491601504ñ159849010300360000005004900000000000000003**30161**800000260 ñ164373251502527330250600000260250502537160249600ñ001602539000ñ04401736016251502 7171673538000073330162500000140162700079460207201200140162700070047021180110014016 71789732700074460219801100160186771618160186272505220186201627220186201627259999 -101935730000522925410162716019990252722019990254122019990254121025039999916020180 $\overline{0}2081\overline{7}349749024040159251500000260249502539421401627000\overline{0}\overline{4}4702198011001602023\overline{0}1618$ $\overline{0}2154\overline{7}31602018\overline{0}25072202018016272202018016274902012026024980252044022580162716024$ \(\bar{0}2300\)\(\bar{7}330253\)\(3302502000001602353\)\(\bar{0}16181602348\)\(\bar{0}250725\)\(9999999991102353000\)\(\bar{0}11102348\) $\overline{0}2373\overline{7}3000\overline{0}21402348\overline{0}2515470234201100421602427\overline{0}24994302448024991102427000\overline{0}2490241$

0251973070707070000000000300000000000000031024880273433025420000002502489025422502 02592734910254325024930254425024950254525025030254625025050254725025070254825025 <u>0266573110254925025130255025025150255144027320255116025010002033025000000427070</u> $\overline{0}2738\overline{7}37070000000707070037070700 \pm 00002602847028533302765000002502847027672502845$ 02811730276625028430276526006170284742000000707070160330803766490299801603308037 $\overline{0}2884\overline{7}3984902998026029610000044029500296133029610000026029610296\overline{1}490290602603605$ 02957730000026029970296112029970000226036030000015032530000226030330290526033520 03030730000110290500005260306902905260312500000440311403125330312500000260312503 03103731254903070026036370000026031610312512031610000226036350000026033760290544 0317673032180335233033520000026033520335<u>7</u>490317402603364033521203364000<u>0</u>21103376 03249730000012032530000147032900120015032530000246033020140049000000440333400099 0332273320360300001103603000002600000036052600000036034900000000000±3400000001023 03395738033720010043034300040148036350363626036030366826036050367049035340340000 3468730001023803372001004403510004014870000100002603603036572603605036594900000 036877342944819076923076909090909111111111114285714282000000000333333333300000 $\overline{0}3760\overline{7}3000000260360503637260360303635490334602603864033522603840038641203840000\overline{0}$

.891

OBJECT DECK LISTING, LP20-7.

310008000060490007200000000085769291509321987157000000000005004900000‡36000000 3600100005003600180005003600260005004900494‡160007900166260007400163250040200166 11001630000111000790000112001650000147000560120036001590050045000440016049000000 01234567891234567890234567890T34567890T24567890T23567890T23467890T23457890T23457 456789013456789012456789012356789012346789012345789012345689012345679012345678±0 $\\0.04757300000000000000000001500410000003800402004002600492004081100492000\\02230049$ 00621730007016007160480021007150041814007169999947007100110026007040071611007040 00694730071259999900400389999900400110071600070140071699999470065001100360000000 03632484455324946536048465462754453627180123456789123456789023456789073456789072

310008000060490007200000000040543224641875962857000000000005004900000‡36000000 3600100005003600180005003600260005004900488‡160007900166260007400163250040200166 0054873160108500571490103499999999991100571000T01100576000T01200425000D14600548 06947304302600824008701100824000T0260086500824260090000824260089500415210089400 **7**34181100895000**1**026008000087014999990009<u>9</u>46009**7**40120014999990009<u>9</u>4600902012 Ō084073001601085Ō08654901054Ō9999Ō999901601085Ō08954901034Ō9999Ō999901100824000T <u>009137301100865000701100895000701100900000701200425000071460081801100210042900418</u> 010597388024904901074026011410000044011300114133011410000026011410114T4901086026

170,

01497730009932017830000011017830000026000000178526000000178349000000000\$34000000 01643734000000010238015520010044016900040148T00001000026017830183726017850183949 OBJECT DECK LISTING, LP20-9

 $\overline{01424736000014601338011001602323\overline{0}14654902292\overline{0}0440\overline{0}053102600656004041601538\overline{0}48292$ $\overline{0149773601632004151101632000\overline{102101631004181499999000\overline{99}46017780120026015910153812$ 72 3007 34 3044 9024 1602602 37 90000044 02 36802 37 93 302 37 9000002602 37 902 37 94 902 32 402 60 30 72 37 37 32 30000026024 1502 37 912 024 15000 02260 302 10000 0150267 100002 260245 102 32 32 602 77 025 92 7344026360277033027700000026027700277049025 92026027820277012027820000211027 027387399320302100000110302100000260000003023260000003021490000000000±34000000010 Ō310373¤342944819Ō769230769Ō9090909T11111111111428571428Ō0000000033333333333000

3100080000604900072000000000083924823884165643830000000000005004900000\$36000000 3600100005003600180005003600260005004901766‡160007900166260007400163250040200166 456789013456789012456789012356789012346789012345789012345689012345679012345678±0 0076773007834902722999990054101100753000T01100758000T01100783000T01200461000D146

 $\overline{0}2008\overline{7}302722\overline{0}0440\overline{0}053101600445\overline{0}0000260045800408260215000450260222000415210221900$ $\overline{0}2081\overline{7}34182102149004182602174021501202174000\overline{0}22602250021502102219004181499999000$ $\overline{0}2227\overline{7}353\overline{0}22454902702\overline{0}0481\overline{9}999901602753\overline{0}22754902722\overline{0}0471\overline{0}044001602753\overline{0}2305490266$ $\overline{0}2446\overline{7}30100490247001700556000\overline{0}03600000005004900000000\overline{4}955435655624962634555630$ $\overline{0}2665733156\overline{0}3614490274201603156\overline{0}4158490274201603156\overline{0}4398490274201603156\overline{0}47344902$ $\overline{0}2811\overline{7}3602845028091202845000\overline{0}226034510000015031010000226028810275326032000000011$ 02884730275300005260291702753260297300000440296202973330297300000260297302973490 $\overline{0}2957\overline{7}3291802603485000002603009029731203009000\overline{0}226034830000026032240275344030660$ $03030\overline{7}3320033032000000026032000320\overline{0}490302202603212032001203212000\overline{0}21103224000\overline{0}01$ $\tt \bar{0}3103\bar{7}3203101000\bar{0}147031380120015031010000246031500140049000000440318200099320345$ 0317673100000110345100000260000003453260000003451490000000000+3400000001023803220 $03249 \\ \overline{7}30010043032780040148 \\ \overline{0}34830348426034510351626034530351849033820340000000102$ $\tt 03322733803220001004403358004014870000100002603451035052603453035074900000034000$ \$\dagger{0}\$3468\bar{7}30000000000000000000\bar{1}0000000\bar{0}\$1\$\dagger{0}\$0000000\bar{9}\bar{9}999999\bar{9}9\bar{1}\$100000000\bar{0}\$1\$\dagger{0}\$29448 0354173190769230769090909091111111111111142857142820000000003333333333300000000000 03614734403646034833303483000004903658032034830000015038750000116038850348324034 03687735303485460387401200460375401100310345503476310347603444310344403455220348 03760735034534603182014002103885034854403814034831503875000021403485000074603874 73833730110047031820120015034750000733034760000021034510000025000990345116033887 03906733158470401001400110345300001470396601400160322800001490323002603451034501 73979735034440000733034450000049031580460335801200330345100000260348503453430412 04052736034443103444034452503451027411203485000014704046014001603228000024903310 04125730320344400000260345303485490315801603388031582303451034834603358012004304 <u>04198732500008416034640000132000850000026034510009249042740160346400000260345100</u>

D_LISTING OF SAMPLE PROBLEM INPUT DECKS, DUPLICATED ALPHAMERICALLY.

THE FIRST CARD OF EACH DECK IS THE HASH TOTAL CARD AND MUST BE REMOVED PRIOR TO EXECUTION.

3100080000604900072	5307115672	690481050M	05004900000		
SAMPLE PROBLEM , LP					
005 006 1					
001 001 1.0	001 002 1.0	001 003 1.0	001 004 2.0		
002 002 1.0	002 003 1.0	002 004 2.0	002 005 1.0		
002 006 1.0	003 001 99.4	003 002 37.75	003 003 19.75		
003 004 54.4	003 005 74.75	003 006 53.0	004 003 0.436		
004 005 19.1	004 006 12.363	005 002 3.0	005 003 0.364		
005 005 9.1	005 006 26.737				
001 00J 0007	002 00J 0008	003 00J 0009	004 00J 0010		
005 00J 0011					
00J 001 00010834	00J 002 000207235	00J 003 0003 0273	00J 004 000407205		
00J 005 000520725	00J 006 0006455				
001 000 60.0	002 000 60.0	003 000 2000.0	004 000 424.0		
005 000 359.0					
999					

3100080000604900072	010089250M	05004900000	
SAMPLE PROBLEM, LP2	•		
005 006 1			
001 001 1.0	001 002 1.0	001 003 1.0	001 004 2.0
002 002 1.0	002 003 1.0	002 004 2.0	002 005 1.0
002 006 1.0	003 001 99.4	003 002 37.75	003 003 19.75
003 004 54.4	003 005 74.75	003 006 53.0	004 003 0.436
004 005 19.1	004 006 12.363	005 002 3.0	005 003 0.364
005 005 9.1	005 006 26.737		
001 00J 0007	002 00J 0008	003 00J 0009	004 00J 0010
005 00J 0011			
00J 001 00010834	00J 002 000207235	00J 003 00030273	00J 004 000407205
00J 005 000520725	00J 006 0006455		
001 000 60.0	002 000 60.0	003 000 2000.0	004 000 424.0
005 000 359.0			
000 001 0.2171115	000 004 23.286457	000 006 13.427085	
001 00K 13.20997	004 00K 258.00095		
999			

3100080000604900072	3173229970	05004900000		
LINEAR PROGRAMMING TEST	PROBLEM. DUAL.	FEED MIX.		
003 004 1				
001 001 -17.0 001	002 -25.0	001 003 -60.0	001 004 -45.0	
002 001 -2.0 002	002 -5.0	002 003 -7.0	002 004 -0.5	
003 001 -1.0 003	002 -1.0	003 003 -1.0	003 004 -1.0	
00J 001 000106600- 00J	002 000209200-	00J 003 000315600-	00J 004 000409600-	
001 000 -35.0 002	000 -1.5	003 000 -1.0		
001 00J 0005000000 002	001 0006000000	003 00J 0007000000		
999				

					A		1	OUT								SES
ROW	ę.						. C (DL UM	N	NU	MBER	? 5				
IVMB	ERS		-2	-1			0				/	 -N				
-1											10/C	(2)				
0		W	PRKING			FUN	CTIONAL		Zj	, - C	- ح	HADO	W PRIC	ES		
1-M		ca	LUMN	1D/C(T)		b(I)				Α(.	I,J)				
					В.			RESS							·	
ROW JUMBO	785						<u> </u>	MN N	UN	18						
			-2	-1			0	1			2				N	
-/		W=	04809					S+10(2M	+3)					5+101	(N+i)(M+	2)-1)
0				S=W+10(1+3)	FUN	CTNNAL	S+10(2M	+4)					5+10	(N+1)(M	+2))
1								5+10(2M	15)							
2																
М		480	9+10(M+1)	5+101	7	S+1	o(2M+2)	S+10(3M1	4)					5+10	((N+2)(M	2)-2)
A	DD	RE	55 0	F A	(I)	ナ)	= 5	+10((J	+1)	(M+2)	+1)				
										-						

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	04150	POTY		INVER
I≒VER	04160	WAIY	MESSV	INVER
INVER	04176	PCTY	,	INVER
INVER	04180FERR	Ŀ	U	INVER
INVER	041901K	C.	K,I	INVER
INVER	04266	r-E	IL	INVER
INVER	04210	e	SPCHG	INVER
INVER	042201L	٢	SPEIV	INVER
INVER	04230	ŕ	SPZCR	INVER
INVER	04240	Α	I,LGT	INVER
INVER	04250	Б	IE	INVER
INVER	05010FINSP	в	0	INVER
INVER	050203PCHG	M	K, NREEL	INVER
INVER	05030	SF	95	INVER
INVER	05040	1 F	к,99	INVER
INVER	05050	M	I, NREFL	INVER
INVER	05060	SF	95	INVER
INVER	05070	TF	J _* 99	INVER
INVER	0508C	TF#	JJ*0	INVER
INVER	05090SGA	c	JJ,N	INVER
INVER	05100	8E	SGE	INVER
INVER	05110	TF	AM, AELM	INVER
INVER	05120	Δ	AM, K	INVER
INVER	05130	Α	AM, JJ	INVER
INVER	05140	TFL	S-AMEM,-AM	INVER
INVER	05150	TF	AN, AELM	INVER
INVER	05160	A	AN, J	INVER
INVER	05170	A	AN, JJ	INVER
INVER	05180	TFL	S-AM,-AN	INVER
INVER	05190	TFL	S-AN,-AMEM	INVER

A JJ, LGT

05200

03110 A . I . N 03120 I + LGT 03130 10 03140ID TFM 1.0 03150IE C I,N 03160 BE FINSP 031701F M I,NREEL 03180 SF 95 03190 TF J,99 03200 TF JJ,I 03210 TFLS-AMEM,-AZER 03220IG C JJ,N 03230 BE IJ 03240 TF AM, AELM 03250 AM,I 04010 AM,J TFLS-AMEB,-AM 04020 CF -AMEBB 04030 TFLS98,-AMEB 04040 04050 FS -AMEB,-AMEM BNF IH,-AMEBB 04060 04070 B IM 04080IH TFLS-AMEM, 98 04090 TF K,JJ 041001M J.N JJ,LGT 04110 IG 04120

CM -AMEM, -99,10

BNE IK

04130IJ

04140

13

INVER

INVER INVER

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05210
              SGA
052209G8
          TEM JJ.0
05230SGC
          С
              JJ,N
05240
          BE SGD
05250
          TF AM, AELN
              AM,K
06010
06020
          A AM, JJ
06030
          TFLS-AMEM,-AM
06040
           TF AN. AELN
06050
              AN, J
06060
           A AN, JJ
06070
          TFLS-AM -- AN
06080
          TFLS-AN,-AMEM
06090
          A JJ,LGT
              SGC
06100
          8
          8
              IL
06110SGD
06120SPDIV M
              I, NREEL
06130
          SF 95
06140
          TF K,99
06150
          TE AM, AELM
06160
              AM, K
06170
          A AM, I
06180
          TFLS-AMEM,-AM
          TF JJ,I
06190
06200SVA
          C JJ, N
06210
           BE SVB
          TF AM, AELM
06220
06230
              AM,K
```

	06250	C Iv	-AP,-99,10,
INVER	07010	taF	* +36
INVER	07020	A	JJ, LGT
INVER	07036	f	SVE
INVER	07040	FÜ	-AM ,-AMEM
INVER	07050	A	JJ,LGT
INVER	07666	P	SVA
INVER	07070SV3	TEM	J J ,0
INVER	07080SVC	С	JJ•%
INVER	07090	ВE	SVI
INVER	07100	LF	AN, AELN
INVER	07110	Δ	4N • K
INVER	07126	Δ	AN, JJ
INVER	07130	CM	-AN,-99,10
INVER	07140		*+36
INVER	07150		JJ,LGT
INVER	07160	В	SVC
INVER	07170	FD	-AN,-AMEM
INVER	07180	Д	JJ,LGT
INVER	07190	ŀ	SVC
INVER	07200SVD		
INVER	072 TUSPZER		I.NREEL
INVER	07220	SE	95
INVER	07230	16	K,99
INVER	07240		J,(
INVER	07250 SRA		
INVER	08010	86	SRF
INVER	08020		J, NN
INVER	08030	PAL	
INVER	08040		AM, AELM
	08050	Λ	AM, I

Α

AM, JJ